This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

BOSTON
MEDICAL LIBRARY

IN THE
Francis A. Countway
Library of Medicine
BOSTON

THE

EDINBURGH MEDICAL AND SURGICAL JOURNAL:

EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

MEDICINE, SURGERY, AND PHARMACY.

VOLUME SIXTY-FIRST.

1844.

EDINBURGH:
PRINTED FOR ADAM AND CHARLES BLACK:
LONGMAN, BROWN, GREEN, & LONGMANS, LONDON:
JOHN CUMMING, AND HODGES & SMITH, DUBLIN.

1844.

PRINTED BY STARK AND COMPANY, EDINBURGH.

PROPERTY OF THE N.Y. MED. SOC.

THE

EDINBURGH MEDICAL AND SURGICAL JOURNAL.

1. JANUARY 1844.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*On the proximate cause of death after the spontaneous introduction of Air into the Veins, with some Remarks on the treatment of that accident.* By JOHN E. ERICHSEN, London. (Read at the Thirteenth Meeting of the British Association for the Advancement of Science.)

THE subject of the Introduction of Air into the Veins has received, within the last few years, a considerable share of the attention of physiologists as well as of practical surgeons;—amongst whom I may mention Amussat, Velpeau, Bouillaud, Poiseuille, and Cormack. Much of the knowledge that we possess on this question is also due to the labours of the Commission appointed for its investigation by the Academy of Medicine of Paris, a report of the proceedings of which will be found in the sixth volume of the British and Foreign Medical Review.

The result of the several inquiries that have thus been instituted has been, that the possibility of the spontaneous introduction of air into the veins during surgical operations, or, in consequence of accidental wounds, has been incontestibly determined; the phenomena that accompany the accident, and the circumstances that may occasion it ascertained; and the situations in which only it can happen, accurately pointed out. As these points, then, may be looked upon as definitely settled, I shall not again refer to them,

but shall confine the observations that I have the honour of laying before this Association to the consideration of the proximate cause of death when air is introduced spontaneously into the circulating system; that is to say, when it is not purposely injected into the heart, but when it gains admittance into that organ either in consequence of one of the large veins in its vicinity being opened at a point where the flux and reflux of the blood are naturally observed, or, during operations, under such circumstances, whether of disease of the coats of the vessel, of traction in the removal of tumours, or of contraction of surrounding muscles, that it forms an unyielding, uncollapsing tube, into which the air is apt to be sucked in order to supply the vacuum, which the action of inspiration has a tendency to occasion within the thorax.

The inquiry into the cause of death consequent upon the spontaneous introduction of air into the venous system is not a purely physiological question, but is of peculiar interest to the practical surgeon, as the mode of treatment to be adopted in those cases of operation or injury in which this unfortunate accident has happened must necessarily depend upon the cause of the occurrence of that fatal event, which it is our object to avert. That this question cannot be considered as having, as yet, been definitely answered, is obvious from the fact, that, within the last year, two theories, altogether opposed to one another, have been published by MM. Mercier and Marchal de Calvi respectively. These will be considered in a subsequent part of this paper. Before proceeding further, however, it may be as well to take in review the opinions of some of the principal writers on this subject.

Bichat* supposed that death was occasioned by the irritation produced by the air whilst circulating through the vessels of the brain. In support of this opinion he states, 1*st*, That the heart beats for some time after all animal life has ceased, and that it is even increased in activity, driving the frothy blood with much force through the lungs and arterial system; 2*dly*, That, by direct experiment, viz. forcing air into the carotid arteries, death may be occasioned; 3*d*, That Morgagni and others relate cases of gaseous apoplexy, (as they are called,) in which the only lesion found is the presence of air in the cerebral vessels. Nysten† was of opinion that the over-distension of the pulmonic ventricle occasioned such a dragging of the fibres of the aortic ventricle as to oppose the free exercise of its contractility;—Dupuytren, that the air having arrived at the right auricle, becomes dilated, distends that cavity, opposes itself to its contractions, and thus stops the circulation;—MM. Piedagnel‡ and Leroy§ that the air, driven

* Recherches sur la Vie et la Mort, pp. 208–212.
† Recherches de Physiologie et de Chimie Pathologiques.
‡ Recherches sur l'emphyseme du Poumon Journ. de Physiologie, 1829.
§ Archives Générales de Médecine, 1823.

by the contractions of the right ventricle, acquires, by the change of temperature, a sudden expansion, distends the capillaries of the lungs, which organs become emphysematous, and that thus the circulation ceases. Amussat* supposes death to be the result of the distension of the right cavities of the heart. Bouillaud† regards the proximate cause of death as threefold, 1*st*, as occurring from enormous distension of the right cavities of the heart, the air being expanded by the heat of the blood, and, consequently, impeding the contractions of that organ; 2*d*, from the presence of spurious blood in the branches of the pulmonary artery, preventing the free passage of the blood through the lungs; 3*d*, from air entering the vessels of the brain, and thus compressing that organ. Dr Cormack‡ is of opinion that the deleterious effects resulting from the entrance of air during operations are purely mechanical, and that the death of the patient depends simply upon the contractions of the right side of the heart being arrested or greatly impeded in consequence of the presence of the elastic fluid. In an able article in Dr Forbes's Journal§ on the introduction of air into the veins, the reviewer says, "with regard to the second cause adduced by Bouillaud we are disposed to think that it has been too much overlooked. The degree in which its operation will be conceded, however, must depend upon the views entertained of the physiology of the circulation. If we believe (as we think we are not only warranted but compelled to do) that the changes which the blood undergoes in the capillaries, both of the lungs and of the general system, are necessary for the creation of a part of the motive power of the circulation, it is obvious, that, if these be stopped in any way, a check must also be put to the movements of the fluid. In asphyxia we cannot doubt that the obstruction of the circulation commences in the lungs, in consequence of the deficient supply of oxygen preventing the due aeration of the blood, and that paralysis of the right ventricle, from over-distension, and of the left, from want of its required stimulus, are but results of this primary cause. Now, when death takes place rapidly from the forcible infiltration of air into the veins, it is easy to perceive how the distension of the right ventricle, and the consequent stoppage of the circulation, are the immediate results of the process. But when air has spontaneously entered, and is found to have passed into the pulmonary artery, it does not seem unreasonable to suppose that it may prevent the passage of the blood with which it is mixed through the lungs,—the due relation between the blood in the vessels and the air in the cells being just as much disturbed by the admixture of air." Marchal

* Recherches sur l'Introduction de l'Air, &c. pp. 240.
† Gazette Medicale, 1838. ‡ Thesis, 1837.
§ British and Foreign Medical Review, Vol. vi.

de Calvi* attributes the sudden death in these cases to the operation of a poisonous agent. He is of opinion that carbonic acid is disengaged from the venous blood by the oxygen of the air that is mixed with it, and that this operates as a poison upon the heart. In confirmation of this he says, that, if expired air be blown into the veins of an animal, it is more rapidly fatal than pure atmospheric air. Lastly, Mercier† supposes that death occurs in the cases under consideration, as in prolonged syncopes; the brain not receiving the blood, which is necessary for the exercise of its functions, and that, as in syncope, death is only apparent, and becomes real by the arrest of the heart's action; so death, from the introduction of air into the veins, only becomes real, because the course of the blood is interrupted for too long a time. The air preventing the passage of the blood from the arterial into the venous system in three ways, 1*st*, by its elasticity; 2*dly*, by its reflux; and 3*d*, by its admixture with the blood. These causes, says M. Mercier, prevent a due supply of blood to the left ventricle, and the small quantity that does reach that cavity being distributed through the arterial system generally, does not arrive at the brain in sufficient quantity to afford that organ its necessary stimulation. The curative indications that he deduces from these opinions will be adverted to in a subsequent part of this paper.

Having thus given a short abstract of the principal opinions that have been advanced in explanation of the occurrence of death after the introduction of air into the venous system, I think it will be found, on a closer examination into the facts on which they are founded, that not one of them is sufficiently free from objection to allow us to receive it as a perfectly satisfactory explanation of the proximate cause of death in these cases. In order to facilitate their analyses, and to avoid repetition whilst discussing them, we will arrange these opinions in four classes, viz.

1*st*, That death ensues from over-distension of the right cavities of the heart. Of this opinion are Nysten, Dupuytren, Cormack, Amussat, and Bouillaud (partly.)

2*d*, That death ensues from the irritation occasioned by the passage of the air through the vessels of the brain.—Bichat.

3*d*, That the heart's action is arrested in consequence of the deleterious influence of the carbonic acid which is eliminated from the venous blood.—Marchal de Calvi.

4*th*, That the circulation is arrested in the lungs, either, as Piedagnel and Leroy have supposed, in consequence of these organs becoming emphysematous, or, as Bouillaud and Mercier, (partly) think from obstruction of their capillaries, or, as the reviewer in Dr Forbes's Journal is of opinion, in consequence of the respiratory changes being interfered with.

* Annales de Chirurgie, Vol. vi. † Gazette des Hopitaux, Dec. 3d 1842.

With regard to the first of these opinions it will be shown in a subsequent part of this paper, that overdistension of the right cavities of the heart cannot and does not take place when air is spontaneously introduced into the veins, although there can be no doubt that, if it be forcibly blown into them or injected by means of a large syringe, as in the experiments of Nysten and of Cormack, the pulmonic cavities of the heart may become so distended, as that their action may be mechanically interfered with. I think, however, that it admits of doubt whether, in any case even of forcible introduction of air, this distension can take place to such an extent as to be sufficient of *itself* to arrest the heart's action.

There have been various opinions entertained with regard to the manner in which this alleged overdistension is produced. By some it has been supposed that the increase of temperature which the air might acquire by mixing with the blood, would cause such an increase in its bulk as might occasion the distension of the cavities of the heart. But, as a given quantity of air only expands by the $\frac{1}{480}$th of the volume it occupies at 32° Fahrenheit for every degree of heat it receives, it becomes obvious that the expansion of air in passing from the temperature of the atmosphere, say 60° Fahrenheit to that of venous blood, 100° Fahrenheit, would not amount to more than the $\frac{1}{12}$th of its bulk,—too trifling an increase to be of any moment.

By others it has been supposed that, during the diastole of the right cavities, the expansion of the air which has been compressed by their systole might occasion such a degree of distension as would be incompatible with their action. But air can only be compressed in an air-tight cavity, which the right ventricle is not, the tricuspid valve not shutting sufficiently closely to prevent the reflux into the dilated auricle of a certain quantity of that spumous fluid with which the ventricle is filled; as may readily be seen by laying open, (before the heart's action has ceased,) the chest of a dog that has been killed by the introduction of air into its veins. But even if the tricuspid valve could shut sufficiently closely to prevent all regurgitation, as the compressive force of the right ventricle would probably not be equal to more than about the 1.15th of the pressure of the atmosphere, as will hereafter be shown, but a very trifling influence would be exerted on the contained air.

Granting, however, that, in cases in which air is forcibly injected, the heart becomes overdistended, will that condition be, of itself, sufficient to occasion death, or must we look to some other cause for the occurrence of that event? The heart has, in these cases, been compared to a bladder, that is overdistended in consequence of retention of urine, and which, as is well known, cannot, when its fibres are stretched beyond a certain point, contract upon

its contents. But does the analogy on closer examination hold good? Is there not this most important difference between the two cases that in the one (that of the bladder) the distension is gradual, whilst in the other (that of the heart) it is sudden. Now the *sudden* introduction of a liquid into the bladder, as when water is injected during the sounding for stone, or previous to the performance of lithotrity, will act as a stimulus to that organ, causing it, if the injection be pushed to distension of it, to contract forcibly upon its contents.

The same effect is produced in the heart. If a small quantity of tepid water be injected into the right cavities of the heart, so as to distend them, immediately after the death of the animal whilst it is still in action, that organ will be observed to contract much more forcibly than before, indeed in a convulsive manner; this is in accordance with the observation of Bichat, which observation I have had frequent occasion to confirm, that the action of the heart is increased in activity after the introduction of air into its cavities. From this, then, it would appear that the fibres of hollow muscles have a tendency to be called into more forcible action rather than to be paralyzed on a sudden attempt being made to distend them, although the opposite may be the case when the distending cause is gradually applied; and as the heart, in particular, seems to be stimulated to increased activity by the presence of air in its cavities, it admits of question whether a sudden distension of the right auricle and ventricle would, of itself, be able to occasion the arrest of the heart's action, or whether this event be not rather referable to other causes that will presently be adverted to.

Before proceeding to the consideration of the question, whether overdistension of the right cavities of the heart does or does not take place when air is spontaneously introduced into the veins, it will be better to give a short description of the phenomena that ensue on the occurrence of such an accident. When a vein at the root of a dog's neck is opened, at a point where the flux and reflux of the blood are perceptible, the air will be observed to enter, at the first inspiratory effort, with a lapping or gurgling sound, expressively called by the French a "*glou glou*," the variety of sound depending upon the size and situation of the opening. The entrance of the air is immediately followed by a struggle, during the deep inspirations succeeding which, fresh quantities of air gain admittance; the entry of each portion being attended by the peculiar sound above described. On listening now to the action of the heart, a loud *churning* noise will be heard, synchronous with the ventricular systole, and the hand will, if applied to the parietes of the chest, perceive at the same time a peculiar bubbling, thrilling, or rasping sensation, occasion-

ed by the air and blood being, as it were, whipped together between the *columnæ carneæ* and *cordæ tendineæ.* As the introduction of air continues, the circulation becomes gradually more feeble and languid, the heart's action, however, being fully as forcible, if not more so, than natural. The animal soon becomes unable to stand, if placed upon its feet rolls over on one side, utters a few plaintive cries, is convulsed, extrudes the feces and urine, and dies. If the thorax be immediately opened, it will be seen that the heart's action is continuing regularly and forcibly, and that the pulmonic cavities, though filled, do not appear distended beyond their ordinary size. The detail of the following experiment will illustrate these points.

The left jugular vein having been exposed in a young puppy, puncture was made in it at a point where the venous pulse was perceptible. Air immediately rushed into the heart, with a liquid hissing sound; the animal then became convulsed, and struggled violently. On listening to the thorax the heart could be heard to beat very forcibly, with a loud churning noise; and a peculiar rasping thrill was perceptible on applying the hand to the parietes of the chest. The air entered at each inspiration, and frothy blood issued from the opening in the vein at each expiration; convulsive movements and deep gaspings ensued, and at each spasmodic action of the muscles of the trunk air was forced out in the form of a bloody froth, whilst at each gasp a fresh quantity gained admittance.

Ninth minute after death. All movement having ceased, the chest was laid open. The heart is beating from 60 to 68 strokes per minute, regularly and forcibly. The ventricles are not fuller than usual, the right auricle is distended with a florid bloody froth, the bubbles of which can be seen distinctly through its parietes. The left auricle is contracted upon itself. At each auricular contraction a quantity of bloody froth can be seen to be forced into the *venæ cavæ*, whence it flows again into the auricle during the diastole of that cavity. Air-bubbles can also be seen through a thin part of the right ventricle near the septum. The *venæ cavæ*, both superior and inferior, are full of large bubbles of bloody froth, which at each systole and diastole of the auricle make a corresponding movement of flux and reflux. The pulmonary artery and coronary veins appear of a lighter colour than usual, evidently from containing less blood. The lungs are very pale, certainly not collapsed, perhaps slightly distended. The pulmonary veins contain but very little blood indeed.

Fourteenth minute after death. The right auricle contracts from 60 to 64 times per minute; the ventricles from 30 to 34. The state of the left auricle could not be observed.

Twenty-first minute after death. The contractions of the ventricles having gradually become more and more slow do not amount to more than six per minute. The contractions of the left auricle have ceased; but the right auricle beats regularly and forcibly about 60 times per minute.

Fifty-sixth minute after death. The right auricle is still contracting about 30 times in a minute. There is an occasional tremulous contractile movement in the ventricles.

Sixty-sixth minute after death. Right auricle contracting about 20 times per minute. The movement of flux and reflux continues in the *venæ cavæ* synchronously with the contractions and dilatations of the auricle. Now and then an irregular contractile movement in the ventricles.

Eighty-sixth minute after death. Right auricle still contracting at times, about 6 or 8 per minute: ventricles perfectly quiet. Experiment discontinued.

On examining the organ of the circulation a large quantity of bloody froth was found in the right cavities of the heart, the *venæ cavæ* and the pulmonary artery. There was no fluid blood in any of these. The left cavities of the heart were contracted upon themselves and contained a very small quantity of black blood; there were no air-bubbles found in the arterial system. The pulmonary veins were nearly empty, containing only a few drops of dark blood. The lungs were very pale and bloodless, and in a mid-state between collapse and distension. I have repeated this experiment many times, and in no one instance have I found the right cavities of the heart distended with the bloody froth, certainly by no means so full as they usually are in cases of death from asphyxia. This is in accordance with the observation of Barthelemy, who states that he has found the heart, after death from the spontaneous introduction of air into the veins, flabby, pliant, and collapsed; and, indeed, as has already been said, the imperfect closure of the tricuspid valve, allowing at each contraction of the ventricle a reflux of the bloody froth into the right auricle, whence at the auricular systole it is partly drawn into the cavæ, will, by acting as a safety valve, effectually prevent so mobile a fluid as air from accumulating in the ventricle to such a degree as to overdistend it.

But, independently of the anatomical characters, which are of themselves sufficient to show that death cannot occur from arrest of the circulation in consequence of any overdistension of the right cavities of the heart interfering mechanically with the action of that organ, it can be demonstrated beyond doubt that death does not take place in the heart at all; that event invariably occurring before the contractions of that organ have ceased. That the heart's action continues uninterruptedly long after respiration

has been arrested, and after the eyelids have ceased to contract on the application of a stimulus to the eyeball—after animal life is entirely extinct—can readily be ascertained by any one who will examine an animal killed by the spontaneous introduction of air into its veins. And that this action of the heart is not confined to merely a few irregular beats, but continues for some considerable time, may be seen by the following analysis of five experiments in which the contractions of this organ were carefully watched and noted.

Expt. 1. Death in nine minutes; action of heart 60 to 68 per minute.

Fifth minute after death. Right auricle 60 to 64; ventricles 30 to 34

Twelfth minute after death. Right auricle 60; ventricles about 6; left auricle has ceased acting.

Forty-seventh minute after death. Right auricle about 30; occasional tremulous movements in ventricles.

Fifty-seventh minute after death. Right auricle about 20; ventricles as before.

Seventy-seventh minute after death. Right auricle feebly and irregularly 6 or 8; ventricles still.

Expt. 2. Death in twenty-one minutes; contractions of heart, 88 to 90.

Fifth minute after death. Right auricle 90 to 94; tremulous movements, with a few irregular contractions in the ventricles.

Eleventh minute after death. Right auricle about 80; twitching movements, but no regular contractions in the ventricles; left auricle has ceased.

Twentieth minute after death. Right auricle 20 to 24; tremulous movements in ventricles.

Twenty-fifth minute after death. Right auricle ceased.

Expt. 3. Death in fifteen and one-half minutes; contractions of ventricles about 100; auricles acting still more rapidly.

Sixth minute after death. Right auricle 96 to 100; left auricle has ceased; regular contractions of the ventricles replaced by irregular contractile movements.

Ninth minute after death. Right auricle 80; ventricles as before.

Fourteenth minute after death. Right auricle about 60; ventricles nearly still.

Nineteenth minute after death. Right auricle about 56; ventricles quite still.

Twenty-seventh minute after death. Right auricle ceased.

Expt. 4. Death in twenty-six minutes; ventricles from 50 to 60; auricles move rapidly.

Sixth minute after death. Right auricle 80 to 88; left auricle has ceased; tremulous movements in ventricles.

Tenth minute after death. Right auricle 40, very irregularly; ventricles usually still.

Nineteenth minute after death. Right auricle about 20; tremulous contractile movements in ventricles. Experiment discontinued.

Expt. 5. Death in ten minutes; heart beating from 80 to 90.

Sixth minute after death. Left auricle ceased.

Seventh minute after death. Right auricle about 60; ventricular contractions somewhat tremulous.

Tenth minute after death. Right auricle about 50; contractions of ventricles slower and more tremulous.

Fifteenth minute after death. Right auricle 40 to 46; ventricular contractions have been replaced by irregular tremulous movements. Experiment discontinued.

From these observations, then, it is evident that the right cavities are not prevented from acting in consequence of overdistension, which, in reality, does not exist, or from the operation of any other local cause, but that the heart continues to beat for a very considerable length of time after respiration and the phenomena of animal life have ceased; and that, consequently, the cause of death cannot reside in that organ, but must be looked for somewhere else.

The second opinion, that death is dependent upon the irritation produced by the presence of air in the vessels of the brain, appears to be equally inconsistent with fact; and may be dismissed with the remark, that air is never found in the cerebral vessels of some animals, such as dogs and rabbits, that have been killed by its spontaneous introduction into the veins, and but very seldom in some others, as sheep and horses; in which animals alone, of those that have been experimented upon, is the elastic fluid ever met with, as Amussat and others have shown, in the left cavities of the heart and the arterial system, and in them but in very small quantity.

In answer to the third opinion, that of Marchal de Calvi, that when atmospheric air is mixed with the venous blood in the right side of the heart, the carbonic acid that is eliminated exercises a poisonous influence on that viscus, it will scarcely be necessary to adduce any formal experimental refutation, as it has already been stated more than once in the course of this paper, that death cannot commence in the heart, that organ being in full activity after respiration has entirely ceased. Were, however, direct proof wanted to show that the elimination of carbonic acid, admitting it to take place in the right cavities of the heart, would exert no direct deleterious influence on that viscus, the experiments of Nysten on the injection of that gas into the veins would afford it. He says, "carbonic acid, even where the product of putrified animal matters, when injected into the venous system in considerable quantity, but

with the precautions necessary to avoid distension of the pulmonary heart, does not produce any other consecutive phenomenon beyond a muscular weakness, which ceases in a few days." * The only argument adduced by Marchal de Calvi in support of his opinion is, that the action of the heart is arrested sooner by expired than by pure atmospheric air. The reason of this difference is, no doubt, that one is blown in, whilst the other gains admittance slowly and spontaneously. The rapidity of death being invariably in the direct ratio of the rapidity and force with which the air is introduced.

We now come to the consideration of the fourth class of opinions, viz. that death is occasioned by the arrest of the circulation in the lungs. It has been shown that death does not occur from overdistension of the right auricle or ventricle, or from the noxious influence on the heart of the carbonic acid, eliminated from the venous blood, or indeed from any cause that affects that organ primarily; nor is it occasioned by the irritation of the air on the brain. There will now, I think, be but little difficulty in proving that the primary cause of the fatal event is the arrest of the blood in the capillaries of the lungs, the consequence of which is that an insufficient quantity is sent to the nervous centres, the due performance of whose functions is necessary for the maintenance of respiration and animal life.

The effect of the injection of certain substances, such as mercury, oil, or purulent matter into the veins, resembles very closely that of air. Death in these cases ensuing either very shortly after the foreign matter has gained admittance into the venous system, in consequence of its being unable to pass through the capillaries of the lungs, and thus arresting the general circulation; or else, if the animal survive the immediate effects of the experiment, it will probably die in a few days of pneumonia; which disease, as Nysten has shown, is very apt to supervene in those dogs that are not immediately killed by injecting air into their veins. The anatomical evidence in support of the opinion that the presence of air in the capillaries of the lungs arrests the circulation through these organs, will be found in the fact, that, although the right cavities may be full of bloody froth, it is very seldom met with in the left side of the heart, or if so, but in very small quantity, merely a few stray bubbles,—in the pulmonary artery being, as far as it can be traced, filled with bloody froth,—in the lungs being always in an exsanguine condition,—and in the pulmonary veins and left side of the heart, and arterial system, being nearly, if not entirely empty of blood, whilst the venous system is gorged as far as the *venæ cavæ* or right auricle, where the presence of air prevents the farther entry of blood. From the analogy, then, afforded by

* Recherches de Physiologique, &c., pp. 93.

the injection of other foreign matters into the veins, and from the *post mortem* evidence afforded by the venous system, and the condition of the heart and lungs, we are, I think, warranted in concluding that the primary arrest of the circulation takes place in the pulmonic capillaries, or in the terminal branches of the pulmonary artery.

The next question that presents itself is the manner in which this arrest is effected. Are we to suppose with MM. Piedagnel and Leroy, that it is owing to the occurrence of emphysema of the lungs, or, that it is the consequence of the due relation between the air in the cells and the blood in the vessels of these organs being disturbed, or, that it is merely the result of a mechanical obstacle afforded by the presence of air in the pulmonary vessels?

With regard to the first of these opinions, there is certainly no proof that emphysema of the lungs takes place, in, at least, the majority of the cases under consideration. There can be no doubt that the lungs are always found pale and bloodless in animals that have been killed by the introduction of air into their veins, but this is rather owing to the absence of blood in the pulmonary veins, and to the presence of a sanguineous froth in the branches of the pulmonary artery, than to any real emphysematous condition of the tissue of these organs. The air-cells of dogs, moreover, are naturally large; hence the lungs of these animals might be considered, by persons only accustomed to look at those of the human subject, to be emphysematous, when in reality they are in their natural condition.

In reference to the next opinion, that the due performance of the changes of the blood in the lungs are necessary for the creation of a part of the motive power of the circulation, and that if these be stopped, a check must be put to the movement of the fluid, it would be leading us too much away from our subject to enter into a consideration of this question, which, notwithstanding the high authority by which it is supported, appears to me to be far from determined in the affirmative. It may therefore be sufficient to state, that the arrest of the circulation in the cases under consideration can be explained without having recourse to this supposition.

We now arrive at the consideration of the effect that the presence of frothy blood, or rather of a bloody froth, in the branches of the pulmonary artery, would have in checking the circulation through the lungs, and, as a necessary result of this, through the system generally. It has already been stated that, on opening the chest of an animal that has been killed by the spontaneous introduction of air into its veins, we shall find the right cavities of the heart and the pulmonary artery filled with a bloody froth, resem-

bling very closely the albumen of an egg, coloured pink and whipped up; the air and blood being, by the contractions of the heart, beaten up so intimately, that neither is perceptible in a separate state. Now it needs but very little proof to show that such a mixture as this will offer a considerable degree of resistance to the passage of blood through the capillary vessels of the lungs.

It is well known to all natural philosophers that the presence of bubbles of air in capillary tubes retards the passage of liquids through them; each bubble acting as a damper, and lessening or even destroying, by its elastic reaction, the momentum of the liquid. That the presence of air-bubbles in the capillaries of the lungs does in reality offer an obstacle to the passage of the blood through the vascular system of these organs, may be proved by the following experiment. Let a pipe be fixed in the pulmonary artery of a dog recently killed, to which a syringe, with a hæmadynamometer adapted to it, should be attached, so that the force with which fluid is injected may be measured, it will now be found that it requires but a pressure of from 1½ to 2 inches of mercury to drive beat bullock's blood through the capillaries of the lungs, so that it may flow in a free stream from the left auricle, or from a pulmonary vein that has been opened. I have indeed seen it flow through with a pressure somewhat below 1½ inches of mercury, and this without any extravasation taking place into the tissue of the lung. Now, if the syringe be detached, and air blown into the pulmonary artery, it will be found that it requires a pressure of from 3 to 3½ inches of mercury to force the beat blood through the same set of vessels. Thus the presence of air within the pulmonic capillaries requires the propulsive power necessary to force blood through them to be nearly doubled. That this is not owing to any peculiar condition induced in the capillaries, but is dependent on the mechanical obstacle afforded by the presence of air in them, is proved by the fact, that as soon as the resistance of the air is overcome, and that fluid driven out of the vessels, a pressure, as in the former case, of from 1½ to 2 inches of mercury, will be fully sufficient to maintain the flow of the blood through the lungs. This experiment appears to me to be conclusive of the fact, that the presence of air in the capillaries of the lungs offer a mechanical obstacle to the passage of fluids through these vessels, which obstacle is in the living body, probably too great for the right ventricle to overcome.*

* It would be exceedingly difficult, if not impossible, to prove the amount of propulsive power exerted by the right ventricle, as the experiment of attaching a hæmadynamometer to the pulmonary artery of a living animal, would be attended by so many modifying circumstances as not to admit of any conclusive result being obtained. If, however, we are allowed to assume that a muscle contracts with a power proportioned to its size, we shall, as the thickness of the walls of the right ventricle are to those of the left, according to Bouillaud, as 2¼ to 7, be allowed to estimate

From what has already been stated with regard to the force that is required to overcome the obstacle that air creates to the passage of blood through the capillaries of the lungs, it is evident that an increase of power in the heart's action would be necessary in order to accomplish this. But, in point of fact, so far from exerting an increased power, the heart exercises scarcely any propulsive influence upon the frothy mixture that has gained admittance into the right ventricle; which is partly driven, at each contraction, backwards through the tricuspid valve and auricle into the *venæ cavæ*, as well as forwards into the pulmonary artery. As the circulation through the lungs becomes more and more impeded, the quantity of blood sent to the left cavities and thence through the coronary arteries to the muscular substance of the heart is proportionally lessened; hence, coincident with the obstruction in the pulmonic capillaries, there is a failure in the power of the heart's action, which renders it less able to overcome the very obstacle that has occasioned it. The quantity of blood sent to the left side thus becoming gradually less and less, until at last it is insufficient to carry on the actions of animal life, when death necessarily ensues. The respiratory movements no doubt ceasing, in consequence of the absence of a proper supply of arterial blood to the nervous centres, preventing the impression of those sensations which are necessary for the due performance of the act of respiration.

The series of phenomena, then, that take place when air is introduced spontaneously into a vein at a point where the flux and reflux of the blood are observable, or within that circle in which the action of respiration is felt, are as follows:—At the first inspiratory effort a quantity of air rushes into the right auricle, where it becomes mixed with the blood. As this cavity contracts at the same moment that the ventricle dilates, a large portion of the air passes into the ventricle, where it is, by the action of the *cordæ tendineæ* and *columneæ carneæ*, beaten up with the blood, the remainder is forced back into the *venæ cavæ*. The ventricle then contracting as the auricle dilates, its contents have a natural tendency to be driven onwards into the pulmonary artery, but this they can only do effectually, that is to say, be forced on with the full power of the ventricle, by having a point of support in the tri-

the power of its contractions in the same ratio. Now, as the left ventricle propels the blood in the arterial system with a pressure equal, on an average, to about five inches of mercury, if anything rather less, certainly not more, the ratio of the pressure exercised by the left ventricle, as compared to that of the right, may be stated by the formula 7 : 2.5 : : 5 : 1.78, which would probably be about the pressure in the pulmonary artery, and which agrees with the force that is required to propel bullock's blood through the vessels of the lungs. But, as it has already been shown that it requires a pressure of from 3 to 3½ inches of mercury to force blood through the pulmonic capillaries, after air has been blown into them, a moving power of less than 2 inches would clearly be unable to overcome such an obstacle, and hence arrest of the circulation must necessarily ensue.

cuspid valve from which to react; but as this valve does not close so completely as to prevent the reflux of a certain quantity of air, regurgitation into the auricle necessarily takes place, which cavity, contracting again, forces the bloody froth into the right ventricle. And thus the same series of phenomena is repeated over and over again, until the capillaries of the lungs becoming more and more obstructed, the quantity of blood sent through them becomes gradually too small to afford a due stimulus to the nervous centres. Hence a kind of syncope is induced similar to what takes place in those cases in which, from any cause, whether profuse hemorrhage or ligature of the carotid and compression of the vertebral arteries, as in Sir Astley Cooper's experiments, an insufficient supply of blood is sent to the brain. The functional activity of the nervous centres being thus depressed, the respiratory movements cease from want of sufficient maintaining power, and animal life becomes extinguished; the contractions of the heart gradually ceasing in consequence of the want of its necessary stimulus,—the blood.

The arrest, then, to the passage of the blood takes place in the capillaries of the lungs or in the terminal branches of the pulmonary artery, in consequence of their becoming obstructed by the air-bubbles. The right auricle and ventricle then become filled with a spumous fluid, which they can neither propel forwards nor drive back to any material extent; but which, oscillating in the large veins about the heart, acts as a mechanical obstacle to the passage of the blood through them. Hence the animal dies as if a ligature were thrown round the superior and inferior cava, and we accordingly find, on examining the bodies of those animals killed by the spontaneous introduction of air into their veins, the same congestion in the venous and absence of blood in the arterial system, that would result from such an operation. From what has been stated, then, in the preceding pages, I think we may conclude;

1*st*, That the primary arrest of the circulation takes place in the capillaries of the lungs, or in the terminal branches of the pulmonary artery, in consequence of inability in the right ventricle to overcome the mechanical obstacle presented by air-bubbles in the vessels of those organs.

2*d*, That respiration and animal life cease in consequence of a deficient supply of arterial blood to the central organs of the nervous system.

Having thus attempted to determine the proximate cause of death after the introduction of air into the veins, we shall now consider the plan of treatment that it is most advisable to employ, not only in warding off a fatal result after air has been introduced into the vessels during operations, but also in preventing, if possible, the occurrence of this accident.

And first of all, as most important, let us take into consideration the best way of preventing the occurrence of the accident in question. Before doing so, however, it may be better, in order to understand the principles on which we should act, to give a brief summary of those circumstances that are peculiarly apt to occasion the introduction of air into the circulating system during operations. Now it is well known that what is called by the French writers the "canalization" of a vein, or its conversion into a rigid uncollapsing tube, is the condition of all others which is most favourable to the introduction of the air into it. Indeed, except in those situations in which there is a natural movement of flux and reflux of the blood in the veins, this accident cannot occur unless these vessels be canalized, or, in other words, prevented from collapsing. This canalization of the vessel may be occasioned in a variety of ways. Either the cut vein may be surrounded by indurated cellular tissue, which will not allow it to retract upon itself, but keeps it open like the hepatic veins; or the coats of the vessel may have acquired, as a consequence of inflammation or hypertrophy, such a degree of thickness as to prevent their falling together when divided. Again, the principal veins at the root of the neck have, as Bérard has pointed out, such intimate connections with the neighbouring aponeurotic structures that they are constantly kept in a state of tension, so that their sides are held apart when they are cut across. The contractions of the platysma and other muscles of the neck may likewise, as Mr Shaw has shown, have a similar effect. In removing a tumour also that is situated about the neck, the traction exerted upon its pedicle may, if this contain a vein, cause it to become temporarily canalized; and the incomplete section of the vessel, especially in a transverse direction, must necessarily prevent the approximation of the sides of the incision in it, which will be rendered open and gaping by the retraction of the surrounding tissues. This patency in the incision in the vein is apt to be increased by the position that is necessarily given to the head and arm in all operations of any magnitude about the shoulders and neck. Lastly, the introduction of air into a vein will be favoured by the vessel being divided in the angle of a wound, the vein being, when the flaps that form that angle are lifted up, rendered open-mouthed and gaping.

On looking over the reports of cases in which air gained admittance into the veins during operations, it will be found that these vessels were always in one or other of the above-mentioned conditions. Thus in Beauchesne's* case, air was introduced in consequence of incomplete division of the external jugular immediately above the right subclavian, whilst in a state of tension during the removal of a portion of the clavicle. In a case that occurred to

* Journal de Physiologie, Tome ix. pp. 80.

Dupuytren* a large vein connected with the tumour and communicating with the jugular, was cut at the last stroke of the scalpel, whilst the tumour was being forcibly drawn up. The vein was found to be adherent to the sides of a sulcus, so that it remained gaping when cut. In a case by Delpech† there was hypertrophy of the axillary vein causing it to gape like an artery. In Castara's‡ case there was incomplete section of a vein, which opened into the subscapular, whilst the tumour was being raised up. In Roux's § a vein in the neck was opened, whilst a tumour, which was being removed from that region, was being forcibly raised, in order to dissect under it. Ulrick‖ saw the accident occur in consequence of the incomplete division of the internal jugular vein which was implicated in a tumour in the neck. A similar case happened to Mirault¶ of Angers, the internal jugular being divided to half its extent. A case occurred to Warren** in which the air entered by the subscapular vein, the coats of which were healthy but in a state of tension, in consequence of the position of the arm ; and another in which the same accident happened from the division of a small transverse branch of communication between the external and internal jugular, whilst in a state of tension. Mott,†† whilst removing a tumour of the parotid gland, opened the facial vein, which was in a state of tension in consequence of the position of the patient's head, when air was introduced. A case is related by Malgaigne,‡‡ in which the accident happened in consequence of the incomplete section of the external jugular vein, which was enveloped in a tumour that was being removed. M. Bégin§§ also relates a case in which this accident happened in consequence of the puncture of the internal jugular whilst he was removing a tumour from the neck.

These cases, which are all that I have been able to meet with, in which the condition of the wounded vein was particularized, show clearly, what is the state of the vessel and of the surrounding parts that is most likely to favour the occurrence of the accident, and consequently, what the surgeon should peculiarly guard against in the removal of tumours about the neck and shoulders, viz. incomplete division of the veins and the employment of forcible traction on the diseased mass at the moment of using the scalpel. I am aware that, in removing tumours from the neck and shoulder, it is in many cases impossible to avoid drawing them forcibly upwards or forwards, in order to get at their deeper at-

* Archives Générales de Medecine, Tome v. pp. 430.
† Memorial des Hôpitaux du Midi, 1830.
‡ Sancerotte. Thesis. § Journal Hebdomadaire, Tome ii. pp. 165.
‖ Journal des Connaissances Med. Chirur., 1834. ¶ Gueretin, Thesis, 1837.
** Gazette Medicale, 1833 ; and Warren on Tumours.
†† Gazette Medicale, 1831. ‡‡ Ibid. 1836.
§§ Presse Medicale, 1837.

tachments; but if this be necessary the chest should, for reasons that will immediately be pointed out, be tightly compressed, so that no deep inspirations may be made at the moment that the knife is being used, or before a divided or wounded vein can be effectually secured.

But although it be necessary for the spontaneous introduction of air into the circulating system, that the vein be either canalized in one or other of the ways that has just been mentioned, or else that it be opened where the venous pulse exists, yet it is only during the act of inspiration that air can gain admittance into the vessel; and it is the more ready to do this the deeper the inspiratory efforts are. If a vein be opened at the root of a dog's neck, it will be found that it is only during inspiration that air rushes in; that none gains admittance during expiration, and but little, if any, when the inspirations are shallow, as when the chest is forcibly compressed by the hands; and that the rapidity of the spontaneous introduction of air is, *cæteris paribus*, in proportion to the depth of the inspirations. This is in accordance with the experiments of Dr Carson and Sir David Barry on the influence of the respiration on the circulation of the blood, and depends upon the tendency that there is to the formation of a vacuum within the thorax, more particularly in the pericardium, during inspiration; at which time the blood is carried with increased velocity along the veins in the neighbourhood of the heart; and when expiration takes place a temporary retardation occurs. This is particularly evident during excited respiration. Now, during operations the state of the breathing is such as to dispose the patient peculiarly to the entrance of air into the veins. When a patient is under the knife, the respirations are generally shallow and restrained, the breath being held, whilst every now and then there is a deep gasping inspiration, at which moment, if a vein be opened in which the pulse is perceptible, or that is canalized, air must necessarily be sucked in; and, as has already been said, in quantity and force proportioned to the depth of the inspiration. This, then, being the case, the mode of guarding against the introduction of air into the veins is obvious. The chest and abdomen should be so tightly bandaged with broad flannel rollers or laced napkins, as to prevent the deep gasping inspirations, and to keep the breathing as shallow as possible, consistently with the comfort of the patient. I have often found, as has already been stated, that the entrance of air into the veins of a dog could be arrested by forcibly compressing the chest of the animal so as to confine the respiratory movements, but that as soon as a deep inspiratory effort was made, the compression having been removed, a rush of air took place into the vessel. If, therefore, during an operation about the root of the neck or summit of the thorax, the chest be bandaged, as here recommended, the surgeon must be careful not to remove

the compression until the operation be completed and the wound dressed, for if this precaution be not attended to, as the patient will most probably, on the bandage being loosened, make a deep inspiration, air may be sucked in at the very moment that all appeared safe.

If compression of the chest did not altogether prevent the entry of air into a wounded vein, it would at all events tend to lessen its quantity, as well as the rapidity and force with which it would rush in; which will always be found to be proportioned to the depth of the inspirations. Thus a very material point would be gained; for it has been fully proved from the experiments of Nysten, Cormack, and Amussat, as well as from recorded cases of recovery in man,* that it is necessary that a certain quantity of air be introduced before death can take place, in confirmation of the observations made long since by Nysten, that a few bubbles of air would not occasion death. Magendie, states that he has several times, whilst injecting medicinal saline solutions into the veins of patients, seen air introduceed without any bad consequences ensuing. In order, then, that the accident prove fatal, it is necessary that a certain quantity of air be introduced into the venous system. This quantity it is impossible to determine accurately, for obvious reasons; but it may probably be stated as being equal to so much as will obstruct the pulmonic capillaries to such an extent, as that a sufficient quantity of blood to support life does not pass through the lungs. If, therefore, in the event of not being able to prevent the entry of some air into the venous system, we can keep the quantity introduced below this, we should be able to avert a fatal termination.

Different plans have been recommended by surgeons for the treatment of those cases in which air has already gained admittance into a vein; but, from the very fatal nature of this accident, it does not appear that much benefit has resulted from any of them. The recovery of the patient in some of the cases appearing to be rather due to the quantity of air that was introduced

* I may mention the following case in proof of the fact that a moderate quantity of air may be introduced into the circulating system of the human subject without any bad consequences ensuing. T. J. aged forty-eight, was admitted into University College Hospital July 2, 1840, for attempted suicide by cutting his throat. On admission there was found on the left side of the neck, about two inches below the ear, an irregular jagged wound, about three and a half inches in length, three cuts having been made; it was bleeding rather copiously. A surgeon to whom the patient had previously been taken had sewed it up. On the stitches being thrown loose, three arterial branches were secured, but the bleeding still continuing from the bottom of the wound, it was found that the left internal jugular was divided. On raising up the vessel in order to apply a ligature to its lower end, my friend Mr Morton, who was in attendance, distinctly heard the peculiar sound occasioned by the rush of air into a vein. He immediately applied his finger to the spot, so as to prevent the further ingress of air and tied the two ends of the vessel. The patient recovered without the slightest bad symptom.

being insufficient to cause death than to any effort on the part of the surgeon. The two principal modes of treatment that have been recommended consist in the suction of the air from the right auricle, and the employment of compression of the chest. Thus Amussat and Blandin advise us to introduce the pipe of a syringe, a female catheter, or a flexible tube into the wounded vein, if it be large enough to admit the instrument, and, if not, to open the right jugular and pass it down into the auricle, and then to employ suction so as to empty the heart of the mixture of blood and air. At the same time that this is being done we are, say they, to compress the chest as forcibly as possible so as to squeeze more of the air out of the heart. Magendie and Rochoux advise suction alone, and Gerdy recommends us to be content with compression of the chest. Warren (of Boston) directs us, according to the condition of the patient, to have recourse to bleeding in the temporal artery, to tracheotomy or to stimulants.

Before entering upon a consideration of these different plans of treatment, however, let us inquire what is the immediate cause of death in the cases in question, and consequently, what deleterious influences we have to counteract? It has already been shown in a former part of this paper, that death ensues in those cases in consequence of the air obstructing the capillaries of the lungs, and thus preventing a due supply of blood from reaching the left heart, and consequently being sent to the brain, whence the functions of this organ becoming suspended, the actions of respiration cease, from the want of a due maintaining power in the nervous centres. This, then, being the case, the indications that present themselves in the treatment are threefold.

1*st*, To keep up a due supply of blood to the brain.

2*d*, To maintain the powers of the heart until the obstruction in the pulmonic capillaries can be overcome or removed.

3*d*, To remove, if possible, the obstruction in the capillaries of the lungs.

We shall now see how far the means already mentioned, viz. suction, compression, &c. can fulfil these indications. And first, with regard to suction, it would no doubt be highly advantageous if we could by this or any other means remove the air that has gained access to the heart, and thus prevent the pulmonic capillaries from being still farther obstructed. But, putting out of consideration the difficulty of finding the wounded vein, the still greater difficulty of introducing a suitable tube a sufficient distance into it,—the danger of allowing the ingress of a fresh quantity of air whilst opening the sides of the incision in the vein so as to introduce the tube, and the risk there would be, if the patient recovered from the effects of the accident, of having phlebitis induced. Putting all these circumstances aside, which appear

to me to be most serious objections, it becomes a question, according to Amussat, who is one of the strongest advocates of this mode of practice, whether by suction with a syringe or the mouth even, any material quantity of air can be removed. He says, that even when the tube is introduced into the right auricle, much more blood than air is constantly withdrawn. These considerations, then, should, I think, make the surgeon hesitate before having recourse to such a hazardous mode of procedure.

The next plan, that of circular compression of the chest,—however valuable it may be in preventing the ingress of air, can, when that fluid has once been introduced into the veins, have no effect in removing it from the circulating system. We cannot, by any compression that we may employ, squeeze the air out of the heart. But compression may not only be productive of no positive good, but may even occasion much mischief, by embarrassing still farther the already weakened respiratory movements, and thus interfering with the due aeration of the small quantity of blood that may yet be traversing the lungs.

Bleeding from the temporal artery can by no possibility be productive of any but an injurious effect, by diminishing the already too small quantity of blood in the arterial system. Opening the right jugular vein may perhaps, to a certain extent, be serviceable by unloading the right cavities of the heart, as Dr Reid has shown it to be capable of doing, and it has been recommended by Dr Cormack on this account. Lastly, tracheotomy cannot be of any particular service, as the arrest of the respiratory function is secondary and not primary.

What, then, are the measures that a surgeon should adopt in order to prevent the occurrence of a fatal termination in those cases in which air has accidentally been introduced into the veins during an operation? Beyond a doubt, the first thing to be done is to prevent the farther ingress of air, by compressing the wounded vein with the finger, and, if practicable, securing it by ligature. At all events, compression with the finger should never be omitted, as it has been shown by Nysten, Amussat, Magendie, and others, that it is only when the air that is introduced exceeds a certain quantity that death ensues. All farther entry of air having thus been prevented, our next object should be to keep up a due supply of blood to the brain and nervous centres, and thus maintain the integrity of their actions. The most efficient means of accomplishing this would probably be the plan recommended by Mercier, who, as it has already been stated, believing that death ensues in these cases, as in prolonged syncope, from a deficient supply of blood to the brain, recommends us to employ compression of the aorta and axillary arteries, so as to divert the whole of the blood that may be circulating in the arterial system to the en-

cephalon. This appears to me to be a very valuable piece of advice, and to be the most effectual way of carrying out the first indication, that of keeping up a due supply of blood to the brain and nervous centres. The patient should, at the same time that the compression is being exercised on his axillary arteries and aorta, or, if it be preferred, as more convenient and easier than the last, on his femorals, be placed in a recumbent position as in ordinary fainting, so as to facilitate the afflux of blood to the head. The compression of the axillary and femoral arteries may readily be made by the fingers of two of those assistants that are present at every operation.*

For the fulfilment of the second indication, that of maintaining the action of the heart until the obstruction in the capillaries of the lungs can be overcome or removed, artificial respiration should be resorted to, as the most effectual means of keeping up the action of that organ. Thus Sir B. Brodie states, that he has seen, in a dog that was beheaded, and whose cervical vessels were tied, the contractions of the head maintained by artificial respiration for two hours and a-half, at which time there were 32 pulsations in a minute, and from my own observations, I can state that, by the same means, this organ may easily be kept in action in an animal that has been pithed, for an hour and a-half. For the purpose of keeping up artificial respiration, the Humane Society's bellows, if they be at hand, might be used, or, if they cannot readily be procured, a split-sheet might advantageously be employed. Before inflating the lungs, it will be necessary to remove everything that can compress the chest, or interfere in any way with the free exercise of the respiratory movements. Friction with the hand over the præcordial region, and the stimulus of ammonia to the nostrils may at the same time be resorted to.

The third indication—that of overcoming the obstruction in the pulmonic capillaries, would probably be best fulfilled by the means adopted for the accomplishment of the second, viz. artificial inflation of the lungs. That the action of respiration, if kept up sufficiently long, would enable the capillaries of the lungs to get rid of the air contained in them, appears to be the case, for I have several times observed that, if a certain quanity of air be sponta-

* I have repeated Mercier's experiment, and made several others on the curative means to be adopted in the cases under consideration, but without being able to come at any very positive result; and I believe that our treatment must be guided by our opinion as to the proximate cause of death rather than by any experimental inquiry, it being impossible to arrive at any definite conclusion by the latter mode of investigation. The same quantity of air, as nearly as one can judge, introduced spontaneously into the veins of dogs of nearly the same size and apparent strength, does not produce the same effects, proving very rapidly fatal in some cases, and not being followed by death in others; it is difficult to determine the causes of this difference, which probably depends on individual peculiarity or tenacity of life. At all events, it prevents our drawing any correct conclusions from the experiments.

neously introduced into the jugular vein of a dog, and artificial respiration be then established and maintained for half or three-quarters of an hour, but a very small quantity indeed, if any, will be found on killing the animal in the cavities of the heart, or in the branches of the pulmonary vessels. I am aware that this is not altogether conclusive of the fact, as the air might be dissolved in the blood, or might still exist in the capillaries of the lungs, although none might be found in the larger branches of the pulmonary artery; but still it seems to me that we can hardly account for the large quantity of air that will disappear, when artificial respiration is kept up in any other way than that some, if not all, of it passes out of the capillary vessels into the air-cells of the lungs.

It may be objected that this accident is so suddenly fatal that there would not be sufficient time allowed for the surgeon to put in practice the means just indicated; but it admits of question whether the rapidity of death in the human subject is so great as is generally stated. The anxiety and consternation produced in the bystanders by so fearful an accident as the introduction of air into a vein during an operation, makes the death of the patient, perhaps, appear more sudden than it really is; the cessation of the vital actions not being timed as in an experiment by the second-hand of a watch. In animals it frequently happens that a considerable time—half-an hour or more, in some of Amussat's experiments as much even as two hours and a-half, elapses before the introduction of air proves fatal. Now, although the tenacity of life may be much greater in the inferior animals than in the human species, yet in man even the length of time that has elapsed between the first entry of the air and the occurrence of death has been very considerable; thus Beauchesne's patient lived a quarter of an hour after the occurrence of the accident; Mirault's between three and four hours; and Clemot's several hours. Amongst the other recorded cases I have not been able to find any but vague statements as to the length of time the patients lived. Thus, then, it would appear that in some cases, at least, the surgeon would have ample time afforded him to put in practice the plan of treatment that has just been suggested.

If by these means we should succeed in warding off an immediately fatal termination to the accidental introduction of air into the veins, we must watch carefully for the supervention of pneumonia or bronchitis, which diseases Nysten has shown to be very apt to occur in those animals that recover the immediate effects of the accident. That the same danger exists in man is evident by the two cases that have occurred to MM. Roux* and Malgaigne† respectively. In Roux's case the patient lived seven days after

* Roux, Journal Hebdomadaire, Tome ii. pp. 161.
† Malgaigne, Gazette Medicale, 1836, pp. 166.

the accident, at the expiration of which period he died of pneumonia; whilst Malgaigne's patient died on the fourth day of bronchitis.

In recapitulation, then, the following are the principal points that it has been endeavoured to establish in this paper;—

1*st*, That the primary arrest of the circulation takes place in the capillaries of the lungs, or in the terminal branches of the pulmonary artery, in consequence of inability in the right ventricle to overcome the mechanical obstacle presented by air-bubbles in these vessels.

2*d*, That respiration and animal life cease in consequence of a deficient supply of arterial blood to the central organs of the nervous system.

3*d*, That as air enters the veins in quantity, in force, and in rapidity, proportioned to the depth of the inspirations, the best mode of preventing the occurrence of the accident, or, at all events, of lessening its probable fatality, would be, in all operations about the dangerous region,—the root of the neck and summit of the thorax,—to bandage the chest tightly with broad flannel rollers or laced napkins, so as to prevent deep gasping inspirations, and to keep the breathing as shallow as possible, consistently with the comfort of the patient.

4*th*, If air have already gained admission, prevent its further entry by compressing, or, if possible, ligaturing the wounded vein by which it had entered.

5*th*, Keep up a due supply of blood to the brain and central organs of the nervous system, by placing the patient in a recumbent position, and by compressing his axillary and femoral arteries.

6*th*, Maintain the action of the heart, by artificial respiration and friction on the precordial region, until the obstruction in the capillaries can be overcome or removed.

7*th*, Remove, if possible, the obstructions in the capillaries of the lungs by artificial respiration.

8*th*, If the patient survive the immediate effects of the accident, guard against the supervention of pneumonia or bronchitis.

Art. II.—*On Inflammation as a process of anormal nutrition, being the substance of six Lectures delivered before the Royal College of Physicians, Edinburgh, during the summer of* 1843. By John Hughes Bennett, M. D., F. R. S. E., Lecturer on the Practice of Physic, and on Clinical Medicine, Pathologist to the Royal Infirmary, &c. &c.

It is daily becoming more and more apparent that the results of *post mortem* examination have ceased to furnish us with facts

sufficiently novel and important to advance the study of pathology. The labours of Broussais, Cruveilhier, Lallemand, Andral, and other leaders of the French school, have been keenly disputed, and the truth thus elicited has been embodied amongst the great mass of medical knowledge. In the same manner the researches of Bright, Abercrombie, Carswell, Hope, and others in this country have been well studied, generally understood and confirmed, and the pathologist anxiously looks for some new mode of pushing forward his inquiries. In this juncture the same means by which healthy anatomy and physiology have been advanced, are now employed by the morbid anatomist and pathologist, and organic chemistry and the achromatic microscope furnish him with a key, by the aid of which a new field is thrown open to his investigations.

Researches thus conducted have led to results as unexpected as they are important. In physiology a theory of organization has been shown to apply to all animated nature,—the vegetable as well as animal kingdoms. It has been demonstrated that the humblest and minutest tribes of plants possess the same original structure, as is to be found in the most gigantic trees of the forest, and in animals the same law applies to the production of microscopic infusoria, as to the development of the largest mammiferous tribes. It is now generally admitted that the functions of nutrition and growth are perfected by means of the formation and development of nucleated cells, and the numerous facts which have tended to elucidate this truth, constitute the basis of the doctrine of cytogenesis.

This theory has been applied with great success to an explanation of the mode in which the normal textures are formed, as well as to the manner in which healthy nutrition and secretion take place. But I do not think that its value, as illustrative of diseased processes, has yet been sufficiently dwelt upon, or that it has been shown to be as universally applicable to the explanation of morbid as of healthy phenomena. If, however, it admit of demonstration that the organic diseases to which animals and vegetables are subject, that the formation of new growths, and the reparation of tissues, are explicable by the same theory, as applies to the development of healthy structure, it must be allowed that a great step will have been made in pathology. Such a consummation, indeed, might enable us to approximate, if not actually reach some primitive or fundamental law which can alone communicate exactitude to medical science.

That the morbid process generally denominated inflammation is in some way or other connected with a perversion or alteration in nutrition, is an idea which has occurred to many pathologists. The general anatomists of Germany even have done much towards

determining the mode in which this is accomplished. Still there are many points which have received little attention, and, notwithstanding the vast importance of this fundamental subject in pathology, and the labours of many eminent men, we are still in uncertainty respecting its intimate nature, and the manner in which its products are generated and developed. An attentive study of the numerous works published on this subject, a careful inquiry into the results of modern researches made by means of organic chemistry and the microscope, as well as investigations carried on by myself in connection with it during a period of three years, have induced me to believe that our views of inflammation would be rendered more simple and precise if it could be demonstrated that that process was only a modification of the functions of nutrition, as explained by the doctrine of cytogenesis. I say demonstrated, because although such a view, brought forward as mere hypothesis, might seem probable, it could never, serve without positive facts, to extend our knowledge of the subject. Such, then, is the object of the present memoir. Inflammation is so intimately interwoven with the theory and practice of medicine, it so meets us at the very commencement of our pathological inquiries, as well as in our treatment of disease, that in all ages it has been made the pivot upon which the medical philosophy of the time has revolved. Thus any doctrine, capable of explaining the various phenomena which usher in, constitute, and follow this morbid process, cannot but furnish those principles on which medicine, both as a science and an art, must ultimately rest.

I shall discuss the subject under the following heads; 1*st*, Cellular theory of nutrition; 2*d*, The blood; 3*d*, The capillaries; 4*th*, The early phenomena of inflammation; 5*th*, The essential phenomenon of inflammation; 6*th*, Terminations of inflammation; 7*th*, The circumstances influencing the terminations; and *lastly*, the conclusions from the whole.

I. Cellular Theory of Nutrition.

The general formation of tissues from cells in vegetables may be shortly described as follows. There is, first, a granular fluid; secondly, a nucleus is formed, which some have described as being made up of an aggregation of these granules, and others, as a corpuscle of a white or dull red colour, enclosing a granule or nucleolus. Upon this nucleus arises a transparent vesicle, at first somewhat resembling the appearance of a watch-glass rising from the dial of a watch, and then the whole constitutes a nucleated cell. The walls of the cell now enlarge. If several lie together they assume a polyhedral form, from the lateral pressure they receive, as in the pith of some plants; fibres are formed from their becoming elongated and splitting up; tubes from the partitions being

absorbed whilst the walls remain; and more solid textures from woody or calcareous depositions taking place on their internal walls. After a time, the nucleus disappears, leaving a non-nucleated cell; but it sometimes remains permanently. It must not be supposed, however, that every granular fluid gives rise to a nucleus, every nucleus to a cell, or that every cell assists in forming other textures. Granules, nuclei, and cells, often remain permanently, thus constituting the basis of several fluids and textures. Some cells have their organization completed when fully developed, as in the *Protococcus nivalis*, and *Torula cerivisiæ.*

In animals the same process takes place. The ovum is a nucleated cell of which the germinal spot is the nucleolus, the germinal vesicle the nucleus, and the vitelline membrane the cell wall. Dr Martin Barry has admirably traced the formation of cells within these, from which, as in vegetables, all the animal structures are formed. As in certain tribes of plants some of these nucleated cells are persistent, so in animals, others, such as blood corpuscles, pigment cells of the choroid, fat cells, and those in cartilage are permanent; in others, the cells undergo various modifications in shape, until they ultimately become developed into the different animal structures. Late researches also would indicate that the nuclei are not only persistent in some of the fully formed tissues, but undergo alterations in form, being flattened and elongated.

Reproduction from nucleated cells has been shown to take place in two ways, 1*st*, by the formation of a fluid between the nucleus and cell wall, in which granules are produced and, subsequently, nuclei and cells, until the original cell wall breaks or disappears, giving exit to the new productions; 2*d*, by new cells arising within the old one, through the division of the nucleus into two or more segments, from each of which a new cell is formed.

This species of growth depends upon the supply of nourishment from without. At the earliest period of development, when the cells are loose, we find them swimming in an albuminous fluid, which contains in solution the elements of nutrition. The cell wall appears to possess a certain vital principle of selection, by means of which these are absorbed. This fluid is called cytoblastema. In the higher plants, when the cells coalesece and undergo transformations, one of the first results of organization is for some of these cells to form a series of canals, by means of which this nutritive fluid is carried to all parts of the organism. In vegetables these vessels, by a species of endosmosis, absorb a nutritive fluid from the soil. This is called sap, and is sent to all parts of the plant. By a species of exosmosis it is again exuded, and constitutes a blastema for the formation and support of nucleated cells. In this way vegetable nutrition is kept up.

Exactly the same process takes place in animals. The ovum,

when merely a nucleated cell, is nourished by a vital selective species of endosmosis. In the higher animals, again, one of the first processes is the formation of canals from cells to carry the nutritive fluid to every part of the organism. In oviparous animals a large quantity of material is accumulated within the shell, constituting the yolk and albumen, from which nourishment is derived. In mammiferous animals during utero-gestation this fluid, or cytoblastema, is also obtained by endosmosis from the blood of the parent, and in them, again, by a species of exosmosis, effused for the origin and support of nucleated cells, which rapidly undergo transformations to form the future being.

After birth nutrition is carried on in a similar manner, only that materials are then conveyed into the stomach and intestinal canal, and from these the vessels by an endosmosis, similar to what takes place in plants, absorb a nutritive fluid called chyle, which is ultimately converted into blood.

Thus nutrition in all organized beings consists in the formation of a cytoblastema, in which nucleated cells are formed, which are again ultimately developed into the different textures or made subservient to the function of secretion.*

If this doctrine be correct (and it cannot be denied that it is supported by a strong body of evidence) there is one point which demands the serious consideration of every medical practitioner, viz. that a healthy nutrition must depend upon the condition of the nutritive fluid or blastema. This, then, leads us to inquire what are the constituent elements of which it is formed, and what are the conditions necessary to maintain it in a state of integrity.

It has been shown by recent chemical researches, that vegetables and animals are composed of similar proximate principles. These Liebig has divided into nitrogenized and non-nitrogenized. The most important of the nitrogenized elements are fibrine, albumen, and caseine, and these may be still farther reduced into one element, viz. proteine, discovered by Mulder. The more important non-nitrogenized elements are fat, starch, gum, and sugar. These abound in carbon.

Now it has been proved by numerous experiments, that no species of nutrition can proceed unless there be a union of at least one of both classes of elements, and in animals the two which are most readily convertible into nourishment are the albuminous and oily principles. These constitute the basis of every texture. The

* M. Mandl has lately attacked the principles of this doctrine on what appear to us very insufficient grounds, and attempted to replace it by a theory of depositions and attractions, of anything but a satisfactory nature. A critical examination of his opinions, however, would lead us too far from the object we have in view. (See *Manuel d'Anatomie Générale, par M. Mandl*, 1843.) Facts to which we shall afterwards allude, undoubtedly show that certain membranes, granules, and filaments may be formed by deposition independent of cellular development. This, however, does not appear to us opposed to the doctrine of *growth* from cells.

granules found in every blastema consist of a minute drop of oil, surrounded by a membrane of albumen. Such are the granules of the chyle, the milk, and the yolk of the egg. That they are not loose drops of oil, as some suppose, is proved by their never uniting so long as the membrane which surrounds them remains perfect. I have subjected milk globules to a great force with Chevallier's compressor, and could never make them unite. To abstract the oil from the membrane the latter must be lacerated mechanically, and hence, why the process of churning is necessary to procure butter from cream.

That the globules of milk are real structures is still farther shown, by their possessing the property of endosmosis and exosmosis, as may be proved on the addition of water and syrup. Now these structures may be produced mechanically.

Dr Ascherson of Berlin made the important discovery that, when a drop of fluid fat was brought into contact with fluid albumen, the latter immediately coagulated, and a membrane is formed. I have performed this experiment again and again, and frequently demonstrated the membrane thus produced to others. Shortly after its formation, it becomes stronger and stronger, and apparently contracts into folds. If, after the membrane has been thus produced, the same globules of oil are mixed intimately together by trituration, it is of course broken up, and an emulsion formed. But I have observed that an examination with the microscope does not now enable us to detect any shreds of this membrane; we only see globules similar to those contained in the milk, which in like manner are composed of an envelope of albumen enclosing the oil.

It was further shown by Ascherson that the sporules and primary cells in the fungi had a similar composition. The isolated cells of animals, such as those of lymph, blood, and purulent matter, are evidently composed of like principles. They are dissolved in æther and alkalies; the cell wall is made transparent by acetic acid, and they all exhibit the phenomenon of endosmosis and exosmosis. Their composition, then, is essentially the same.

Still the globules in an emulsion or in the milk, though real structures, are not living structures. When and how vitality is stamped upon them is still a mystery, but I believe that they constitute the nucleus of every cell, and that the moment life is imparted to them, a series both of chemical and structural changes takes place. By the first the original element of the nitrogenized principles proteine is converted into fibrine, caseine, or albumen, according to the demands of the organism, and by the second bone, muscle, nerve, and all the various tissues are produced.*

* The formation of these globules by the mere union of oil and albumen is cited by Mandl as an objection to the doctrine of cytogenesis, and as favouring his theory

These views are not only important as a matter of theory, they admit of practical application to the treatment of disease. For instance, in scrofulous persons we see nutrition impeded. The nitrogenized elements are in excess; the evacuations even become albuminous and are glairy like white of egg; gradually the albuminous principle of the blood becomes predominant, while the globules are diminished in quantity; at the same time the fatty or carbonized principle disappears, and emaciation takes place; at length albumen is deposited in the textures, constituting tubercular effusions, the destructive effects of which on organs essential to life are ultimately fatal. The whole of this process is evidently one of perverted nutrition; and that this is owing to an absence of the carbonized or oleaginous elements and an excess of the nitrogenized or albuminous, must be evident. The indication of cure, then, under such circumstances, must be to introduce into the system the first named principle, namely, fluid, fat, or oil, in order that it may combine with the excess of albumen, and constitute a healthy blastema for the support of nutrition. The value of this practice is not hypothetical, it has been well established for the last twenty years, long before any theory regarding it was formed, or the doctrine of cytogenesis heard of. In Germany the animal oils are extensively used in all cases of perverted nutrition, from excess of albumen, they have long held and still hold a prominent place in all the pharmacopœias of Germany, Holland, Sweden, and Denmark, and, at the present day, are continually prescribed by the most eminent practitioners, both physicians and surgeons of those countries. Perhaps there are few articles in the Materia Medica the value of which, in the cases indicated, has been supported by such a mass of incontestible evidence.*

Although the doctrine of cytogenesis undoubtedly embraces a vast number of facts, late researches have shown that it is not so universally applicable as Schwann and his followers have supposed. We have already alluded to the formation of a membrane, and of structures by the union of oil and albumen. The former is very analogous to the sarcolemma, and basement membrane of Bowman, and we have seen a similar one form on the surface of healthy blood during the act of coagulation. Filaments also are deposited in the *liquor sanguinis* of buffy blood which may be seen forming under the microscope independent of cells, as noticed by Gulliver and Addison. Further, the clot frequently prevents a purely fibrous structure, and, there is every reason to sup-

of depositions, inasmuch as true cells may be thus formed without either nucleus or nucleolus. The opinion we have advanced above, however, respecting the real character and object of these structures, will perhaps reconcile any seeming discrepancy which may exist regarding them.

* See the Writer's Treatise on the *Ol. Jecoris Aselli.*

pose, as we shall afterwards see, that this fibrous and filamentous texture is subservient to union by the first intention, independent of the formation of nucleated cells. But although the proposition, that every filament is the result of cellular development, requires modification, we have no doubt that all the compound structures, and the essential phenomena of growth, are mainly attributable to the transformation of nucleated cells. Instead, however, of supposing that this alone constitutes the process of formation, facts, in our opinion, indicate that this is combined with the occasional production of membranes, granules, and filaments by means of simple deposition. Perhaps also it may ultimately be seen even more decidedly, that the theory of deposition brought forward by Mandl, should be more or less conjoined with the beautiful doctrine of cytogenesis elaborated by Schleiden and Schwann. If so, future researches must determine the limits which should be ascribed to each, in order that our ideas of formation and growth may be rendered more universally applicable, than by adopting one view to the exclusion of the other.

From all that has preceded it must be evident that the process of nutrition is dependent, on the one hand, upon the blood, and, on the other, upon the structures by means of which its nutritive portions are eliminated. These, therefore, it will be necessary to take into consideration.

II. The Blood.

The study of the blood naturally divides itself into that of the solid and that of the fluid portions. The former consists of the different corpuscles which float in the latter, or the blood plasma. We shall consider each of these in succession.

Corpuscles in the Blood.—Three kind of bodies are found floating in the blood plasma or *liquor sanguinis*, 1*st*, The yellow (commonly called red) corpuscle. 2*d*, The colourless corpuscle; and 3*dly*, minute granules.

The form and character of the yellow corpuscle, as seen under the microscope, is so well known that I need not dwell upon it. Its structure and composition, however, is still a matter of dispute. Most diversified opinions have been held on this subject, all of which, it appears to me, may be reduced to the following. The yellow blood corpuscle has been regarded, 1. as an animalcule, (Kircher, Borelli;) 2. as a globule of oil, (Malpighi;) 3. as composed of six particles, each of which are formed of six lymphatic globules, (Leuwenhoeck;) 4. as a ring enclosing an opening in the centre, (De la Torre) 5. as a vesicle containing a nucleus which moves in it like a pea in a bladder, (Hewson;) 6. as a solid fibrinous body of a biconcave form, (Young, Hodgkin, Lister, Gulliver;) 7. as a homogeneous body in the

living vessel which partly coagulates when dead to form a solid centre, (Blainville, Mandl;) 8. as a vesicle containing a nucleus surrounded by air, (Schulz;) 9. as a vesicle simply containing semi-fluid colouring matter, (Donné;) 10. as an organized nucleated cell, (Schwann,) with six nuclei, (Barry;) 11. as a vesicle containing a nucleus attached to it by its poles, surrounded by a coloured fluid, (Rees, Lane;) 12. and lastly, as a body containing a spiral filament, the elementary texture of all tissues, (Barry.)

On taking into consideration the structure of the yellow corpuscle, we must consider its physical properties, for it is evident that no view of its formation can be correct if it do not harmonize with the known facts regarding it. Thus, the yellow blood corpuscle is, 1*st*, highly elastic. It may be seen when examining structures running between solid or agglomerated masses, elongating itself, and after having passed the obstruction rapidly regaining its original circular form. 2*d*, It exhibits the phenomenon of endosmosis and exosmosis. Water causes it to swell, to lose the form of a disk, and to become colourless and globular. Syrup, on the other hand, causes it to contract and shrivel up. 3*d*, The addition of weak acetic acid dissolves, or renders very transparent, its outer wall, whilst its central portion becomes insolated and prominent. These facts must be acknowledged by every histologist who has carefully examined these corpuscles, and it must be evident that they are totally opposed to the opinions of Kircher, Borelli, Malpighi, Leewenhoeck, De la Torre, Young, Hodgkin, Lister, and Gulliver. On the other hand, they are more or less in harmony with the views of Hewson, Blainville, Mandl, Schulz, Donné, Schwann, Rees, Lane, and Barry.

A criticism of the different opinions these observers have brought forward would carry us too far; suffice it to say that a careful examination of them, in conjunction with numerous observations of my own, have convinced me that the view of Schwann combines in itself all the facts with which we are acquainted regarding the corpuscle, viz. that it is a nucleated cell, subject to the same vital laws of growth and decay as those of similar isolated and organized structures. All the observations which have been made with respect to its development agree with this view of the subject. Moreover, I have occasionally, like Donné, seen the outer wall break, the fluid escape, and the shrivelled-up membrane remain. Like Barry, I have seen these corpuscles undergo rapid changes in form, sometimes appearing as if the nucleus were attached to the side, at others, the edges serrated, and at others, the whole structure oval, square, or crescentic.* Like him also, and Quekkett, I have occasionally seen the cell enclose granules, which

* Indeed these bodies may be said to undergo endless varieties of shape, under different circumstances.

are given off on the rupture of its wall, and sometimes I have seen in the nucleus of the corpuscle, an enclosed granule or nucleolus. All these facts support the view of its cellular origin and nature, and we may consider this structure as composed, in the majority of instances, of a nucleus, a cell wall, and a fluid interposed between them.

The steps by which these bodies are formed in the adult, and their ultimate destination, have not yet been accurately traced. It is very probable, however, that they will be found to obey the same laws as govern the development of organized cells in general. The granules of the chyle entering the torrent of the circulation probably constitute the nuclei of these bodies, which assimilating from the *liquor sanguinis* as a blastema, the elements of nutrition undergo further changes to constitute the perfect nucleated cell. After a time it is likely that they are again dissolved in the blood-plasma. In this way the yellow corpuscle and *liquor sanguinis* may be said to be mutually convertible into each other.

With respect to the functions of these bodies, I consider that the theory of Liebig perfectly agrees with most of the pathological facts with which we are acquainted, and even with what we know of the formation of these bodies. He shows that they are the only structures in the blood which contain iron, and to this circumstance we must attribute their colour. Whether, however, the oxidized compound of iron be dissolved in the fluid existing between the nucleus and cell wall, or exist in a more solid form lining the latter, has not yet been demonstrated. Most probably the first opinion is the correct one, as asserted by Rees and Lane. At all events, we may, with Liebig, regard the yellow corpuscles of the blood as the carriers of oxygen, which they absorb in the lungs and give off in the capillaries. Hence two processes of oxidation are continually going on: by the one, the constant temperature of the lungs, and by the other, the heat of the rest of the body is maintained. For the facts and observations from which this theory is deduced, I must refer to the work of Liebig itself.

The colourless corpuscle has received a much less share of attention than the one just noticed. In the Mammalia they were first seen by M. Mandl. Their number in man differs in different individuals. I have sometimes seen them very numerous, whilst at others scarcely one can be discovered. I have frequently found also that whilst aortic blood is free from these bodies, that of the *vena cava* in the same subject contains great quantities of them. Whether they are similar to the lymph corpuscles in the blood of reptiles, described by Spallanzani and Müller, it is difficult to determine. They are not of the same size; and it is worthy of remark, that in reptiles the yellow corpuscle is the larger, the white one is the smaller. In man it is the reverse. In

reptiles we can see them moving in the living vessel. This of course has never been observed in man, nor, so far as I am aware, in the Mammalia, although the bat's wing offers a favourable means for observation. There is one difficulty, however, with respect to their existence in the blood of mammals, viz. that from their size they could not pass through a great part of the capillary system. Are we then to believe with Mandl, that they are fibrinous globules, that is, the fibrin coagulated on the object glass? Such a conclusion appears to me opposed by the fact, that they possess cell walls, contain granules, and exhibit a distinct nucleus on the addition of acetic acid. They are, therefore, organized cells. On a superficial examination they resemble pus globules, and have no doubt been often mistaken for these corpuscles.

Besides the structures just alluded to, minute granules are found in the blood, resembling those of chyle, and such as are found within all organized cells. Whether they are the same granules seen in the chyle which have undergone no further change, or whether they are the granules found in the white and occasionally in the yellow blood corpuscle, is still undetermined. No doubt, however, that many of these granules exist in the blood, varying in number and size in different circumstances even in the same individual. In this, then, as in every other blastema for the support of nucleated cells, we see granules and corpuscles in different stages of formation.

It has been thought by Donné, and others (Barry,) that these three kinds of bodies are only different stages of one growth. That one or more of the granules unite to constitute a nucleus; but whether the yellow or the white corpuscle is the next or the ultimate stage of growth is not determined. There can be little doubt that the existence of these different corpuscles in one fluid are connected with some such explanation, and it further seems probable from an analogy to the development of cells in general, that the white corpuscle is the last stage of the process. It has already been stated that granules are occasionally seen within the yellow corpuscle, and we have only to suppose these increased, the whole structure enlarged, and an absence of colour to constitute the white one. That they are so few in number when compared to the yellow corpuscles is dependent possibly on a large number of the latter being dissolved. We may, however, readily conceive that some escape and undergo further development.

Let us now consider the fluid part of the blood, the *liquor sanguinis* or *blood plasma.*—This fluid, when seen in the vessels of a living animal, appears perfectly transparent. Under certain circumstances it is known to possess the property of coagulation, that is to say, the fibrinous portion becomes separated from the albuminous in a solid form. This process of coagulation is different according as it takes place, removed from the body, or in contact with the living tissues.

It is now well known that the corpuscles of the blood take no active part in the formation of the clot. They are merely entangled in the meshes of the fibrin, and impart their colour to it. They may, however, be separated from it mechanically by washing or by stirring the blood with rods while in the act of coagulation. In some states of the blood the corpuscles sink to the bottom of the vessel, and a buffy coat is formed. This is favoured by every circumstance which retards the coagulation. Hence why a large opening in the vein and a deep vessel induce, whilst a small interrupted stream, a shallow vessel, and a cool atmosphere retard the formation of the buffy coat.

It has long been supposed that this phenemenon is especially connected with an inflammatory state. Piorry even calls it hematitis or inflammation of the blood. That the buffy coat is common in acute inflammations cannot be questioned, and it would appear to result from the greater specific gravity of the corpuscles, as compared with that of the *liquor sanguinis* in such cases. This was first pointed out by Jurin, and confirmed by J. Hunter and J. Davy. It would also seem from the experiments of Mandl, that, notwithstanding the greater quantity of fibrin found in inflammatory blood, that its specific gravity is somewhat lower than in health, and the observations of Nasse, Thackrah, Scudamore, Babington, and others support the same conclusion.

Further, it is well known that a buffy coat often appears in the third cup of blood taken, although not in the first or second. This has more especially been observed in rheumatism. Here the blood has been too dense and tenacious to allow the easy deposition of the yellow corpuscles; but no sooner is it rendered somewhat thinner by venesection than the globules subside more quickly, and a colourless layer of fibrin is formed on the surface.

It has been shown by Andral and Gavarret that in inflammations an excess of fibrin exists in the blood, and that the proportion is not only increased relatively to the globules and its other constituents, but as regards the amount of this fluid in the body. A buffy coat, however, may also exist on the clot of anemic patients, especially of chlorotics. In such cases the yellow globules are diminished in quantity, whilst the amount of fibrin remains normal. Here, then, a similar disproportion between the fibrin and globules takes place, causing a like result, although the pathological state is very different. A buffy coat, therefore, although frequent in inflammations, cannot be considered as peculiar to them.

On examining a portion of the clot under the microscope, it

* Nasse and Wharton Jones attribute the buffy coat to an increased attraction existing between the yellow corpuscles. The latter suppose that they form a net or sponge-work, the contraction of which squeezes out the colourless *liquor sanguinis.*

will be found to be made up of minute filaments interlacing each other and mixed with the corpuscles of the blood, as was first pointed out by Mr Gulliver. The mode in which these filaments are deposited is well described by Mr Addison. The process is best seen in blood removed from a man labouring under acute pleuritis. I have frequently had opportunities of confirming the observations of Mr Addison, and of seeing these filaments form under the microscope. The process is somewhat analogous to crystallization, except that no regular forms are produced, and the filaments float loose in the serum, or are more or less interlaced with each other.

Mr Gulliver states that nucleated corpuscles exist in the colourless clot, and supposes that in coagulating such corpuscles are formed. Now coagulation is the last vital act of the blood, and it would certainly be surprising if new growths were to spring up when life is about to become extinct. The formation of filaments is simply an act of deposition, and is completed in a few moments. A nucleated cell, on the other hand, is the result of growth, must pass through regular stages, and can scarcely be conceived to be formed so rapidly. I have in vain looked for corpuscles that might be attributed to such a source. But I have frequently seen the yellow corpuscles deprived of their colouring matter intimately mixed with the filaments, the which, it appears to me, must have been mistaken for nucleated cells proper to the clot.* I have frequently endeavoured, by maceration and washing, to separate the blood-globules from portions of clot; but although I have readily made the latter colourless, yet I never could succeed in entirely removing all the corpuscles.†

Coagulation sometimes takes place within the vessels during life, causing more or less obstruction, or it is the result of the formation of aneurismal pouches. In either case portions of the clot are often found colourless from the readiness with which the yellow corpuscles are precipitated. On the other hand, coagulated *liquor sanguinis*, when exuded into the living textures, presents appearances and undergoes changes, which will be more particularly alluded to in a subsequent part of this memoir.

As regards the function of the *liquor sanguinis* it is entirely subservient to nutrition. During life, portions of it are continually exuding through the capillary vessels, and undergoing changes by means of which the texture and secretions are constantly forming. It holds in solution all the principles essential to the constitution of these, which are elaborated in different organs through the medium of the minute blood-vessels. Whilst, on the one

* The colourless corpuscles found in the clot, which Andral describes as *globules blancs* after the addition of sulphate of soda, are, in my opinion, changed yellow corpuscles, and not the granular bodies destitute of colour found in healthy blood.

† Of course the corpuscles found in exuded lymph, from inflammation, are not to be confounded with those here alluded to.

hand, it is continually receiving, from the result of digestion, new matter, so, on the other, it is always dispensing this in an altered form to every part of the organism to meet the wants of the economy.

We find, then, that the blood consists of a solid and of a fluid portion, and may be regarded as continually carrying on two great systems of operations. The solid particles are subservient to the production of animal heat, whilst the fluid portion is subservient to the function of nutrition. These two operations are intimately connected with one another. Without a certain temperature, as we shall afterwards see, the growth of organized beings cannot proceed, and without the existence of nutritive elements, capable of undergoing chemical transformation, animal heat cannot be maintained.

In the performance of these important operations the blood itself is dependent on a system of vessels distributed through the organism. Whilst the first furnishes the essential material, the latter is the apparatus through whose agency the effects are produced. Thus we are led to a consideration of

III. The Capillaries.

To the naked eye blood-vessels appear to be formed of three coats. 1*st*, The internal or serous; 2*d*, the middle or fibrous; and 3*d*, the external or cellular. A more minute examination has enabled the histologist following Henle to demonstrate the existence of six layers, each of which may readily be distinguished by its intimate texture. They may be enumerated as follows, proceeding from within outwards. 1. The internal layer which presents all the characters of pavement epithelium. 2. The second layer is a transparent, delicate, and fragile membrane, which easily rolls upon itself. It is distinguished by long, occasionally branched filaments, running transversely, with round or oval openings of various sizes perforating the layer. It is occasionally absent. 3. The third layer is characterized by longitudinal lines which are in no way changed by acetic acid. It is formed of one and sometimes of several membranes. 4. The fourth layer is characterized by short transverse fibres, which alternate with each other. It is much developed in large vessels, and constitutes the principal portion of what is called the middle coat. 5. The fifth layer is only found in the large arteries, and is, in point of fact, true elastic tissue. 6. The sixth layer is composed of cellular tissue, the fibres of which are arranged longitudinally, having scattered here and there persistent nuclei.

The satisfactory demonstration of these different layers requires great care. Some are better seen in the arteries than in the veins, or in vessels of a particular size. For all the necessary information on this subject I must refer to Henle. The smallest twig of

a vessel in the mesentery of a rabbit, rendered transparent by weak acetic acid, and examined under a power of 500 linear diameters, will immediately convince any one of the accuracy of his description.

As the vessels approach the periphery the coats become fewer and fewer in number. The cellular, longitudinal, and transverse layers remain in very minute vessels. At length the two first also disappear, and in the true capillary or intermediate vessel we have nothing but the remains of the transverse. It is composed of a simple transparent, yet very firm membrane, without the smallest opening, studded at irregular intervals with nuclei of various shapes. These are sometimes round, at others oval, and occasionally approaching a square form. I have found it very easy to demonstrate these vessels on subjecting a portion of *pia mater* to the microscope. In the rabbit and mouse their characters are very distinct and beautifully defined.

In the numerous demonstrations I have made of these structures, I was struck with the resemblance which the capillary vessel presented to the fibres of non-voluntary muscles. These, it is well known, are described by histologists to be composed of bands, with nuclei scattered at irregular intervals in their substance. I subsequently discovered that, if the mucous coat be carefully removed from a portion of intestine, (say in the rabbit,) and the remaining structure rendered transparent by acetic acid, a longitudinal and transverse coat, with longitudinal and transverse lines, formed by elongated nuclei, are apparent as in the coats of arteries. In short, the two structures in some demonstrations were so similar, that I should have had some difficulty in recognizing one from the other, were the microscopic examinations above attended to. Repeated examination of this fact, as well as numerous observations on the organic muscular fibre, have led me to the conclusion, that no structural difference exists between what is called the muscular coat in the intestines, and that constituting the third and fourth layers in arteries, as previously described. Neither does any essential difference exist between these last and the ultimate texture of the capillaries. If this opinion be correct, then it will be natural to suppose that their function is also similar.

The question of the muscular structure of arteries has been long a subject of dispute. Latterly, however, physiologists have, for the most part, concluded that the arteries are not muscular, although they all acknowledge that the capillaries possess undoubted contractility. Now, if this property depend on the so-called muscular coat in the intestinal walls, why should not the contractility in the capillaries be connected with a structure which we have demonstrated to be similar. We are certainly inclined to hold this opinion, the which is rendered more probable from the fact, that the contractility is more evident and powerful where

the structure is most free from all others. In the larger arteries and veins, the layer of epithelium, the fibrous and cellular coats more or less retard its action, and we have no evidence of powerful contraction in those vessels. In the capillaries, on the other hand, where this structure constitutes the whole of the vascular wall, the contraction is very powerful, as is demonstrated by a crowd of physiological and pathological facts.

The term muscular fibres, as applied to this structure, gives rise to very erroneous notions. Persons naturally conceive that some relation exists between voluntary and non-voluntary muscle, whereas no two elements can be more distinct. The fibres seen running longitudinally and transversely, as in the intestinal coats; the fibres of the bladder, stomach, &c. have no analogy whatever with the striated fasciculi of voluntary muscle. Their mode of contraction, also, is perfectly unknown. The fact, however, viz. that the structure hitherto called non-voluntary muscle is the same in the contractile coat of the muscles and intestines, the middle coat of the arteries and in the capillaries, leaves very little doubt in my mind, that the vital contractility possessed by all these tissues is the same, and dependent on the same causes.

The mode in which the capillaries are arranged merit great attention. The term capillary derived from the Latin *capillus*, a hair, was formerly only intended to convey the meaning of a fine vessel. It is now found to be very vague. Most of the vessels constituting the pheripheral vascular system are much smaller than the human hair, some even not above one-sixth or one-tenth of its size. The smallest are those which will only permit one blood globule to pass through it in single file. These vessels are formed of the simple structure formerly described. Others are much larger, and allow two or more globules to pass abreast, and are composed of two layers. Berres and Hyrtl have distinguished these two kinds of vessels from each other, calling the latter capillaries, and the former intermediate vessels. According to them we have arterial capillaries and venous capillaries, and an intermediate system connecting the two. This distinction, which is supported by the structure, and probably the function, is certainly deserving attention.

A description of the various net-works which the capillary and intermediate vessels form, would be foreign to the object of this memoir. I must content myself with referring to the works of Berres, Hyrtl, and Krause. Suffice it to say, that, although the distinctions made by the first anatomist are perhaps unnecessarily numerous, still most characteristic differences really exist, indeed so much so as to enable one readily to detect the tissue or organ, simply from an inspection of its vascular arrangement. Further, I think it can scarcely be denied that the arrangement of the minute vessels is intimately connected with the peculiar structure

and functions of the organs which they supply. The crossed twig in cellular tissue; the straight capillaries with their intermediate vessels at right angles, in muscle; their peculiar arrangement in the cortical substance of the kidney, in the liver, &c., all lead to the supposition that the disposition of these vessels is intimately connected with the distinctive results of nutrition and secretion in various localities.

The more specific office of the capillaries and intermediate vessels is evidently, 1*st*, so to subdivide the blood that it may reach every portion of the organism, and enable its corpuscles to perform their function. 2*d*, to offer a membrane by means of which exosmosis and endosmosis may be effected. What the connection may be between the vital properties of those vessels and the exudation of blood plasma it is difficult to determine. We may remark, however, that the delicate homogeneous structure they present, admirably fits them for acting as fine filters subjected to vital laws,—retaining the solid corpuscles and granules, and allowing only the fluid portions to transude. How far the circulation is influenced by the contractility of the capillaries is still a matter of inquiry.

From these considerations the importance of the capillaries, as connected with nutrition, will become apparent. So long as they only permit that amount of blood plasma to exude which is capable of supplying the quantity dissipated by waste, so long they may be considered as performing their functions in a normal manner. But when circumstances induce such a change in them that the amount of exudation is materially diminished or increased, then an *anormal* state is occasioned. If the amount be diminished, atrophy will be produced, if it be increased, that peculiar pathological change, hitherto denominated inflammation, is constituted. The steps by which this is occasioned we shall now proceed to consider.

IV. The early Phenomena of Inflammation.

Numerous researches and experiments have determined that the phenomena of inflammation, as observed under the microscope, take place in the following order. 1*st*, The capillary vessels are narrowed, and the blood flows through them with greater rapidity. 2*d*, The same vessels become enlarged, and the current of blood is slower, although even. 3*d*, The flow of blood becomes irregular, it oscillates, that is, goes forwards and backwards, and sometimes stops for a period, and then resumes its course. 4*th*, All motion of the blood ceases, and the vessel appears fully distended 5*th*, and *lastly*, the blood is either effused by rupture into the surrounding tissues, or the *liquor sanguinis* is exuded without rupture. These different phenomena produce the more evident appearances of redness, heat, pain, and swelling.

The first step in the process, viz. narrowing of the capillaries, is readily demonstrated on the addition of acetic acid to the web of the frog's foot. If the acid be weak, the phenomena occur more slowly and gradually. If it be very concentrated, the phenomenon is not observed, or it passes so quickly into complete stoppage of blood, as to be imperceptible. Although we cannot see these changes in man under the microscope, certain appearances indicate that the same phenomena occur. The operations of the mind, for instance, as fear and fright, and the application of cold, produce paleness of the skin; an effect which can only arise from contraction of the capillaries, and a diminution of the quantity of blood they contain. In the majority of instances, also, this paleness is succeeded by increased redness, the same result as follows from direct experiment on the web of the frog's foot, constituting the second step of the process. This depends on the enlargement of the capillaries and the greater quantity of blood they contain.

The variation in the size of, and amount of blood in the capillaries is conjoined with changes in the movement of that fluid. Whilst the vessels are contracted the blood may be seen to be flowing with increased velocity. Indeed, so far as my observations go, the increased swiftness of the blood is the principal proof of diminution in the calibre of the vessel. After a time, the blood flows more and more slowly, without, however, the vessel being obstructed; it then oscillates, that is, moves forwards and backwards, or makes a pause, evidently synchronous with the ventricular diastole of the heart. At length the vessel appears quite distended with yellow corpuscles, and all movement ceases.

Again, these changes in the movement of the blood induce variations in the relation which the blood corpuscles bear to each other, and to the walls of the vessel. In the natural circulation of the frog's foot, the yellow corpuscle may be seen rolling forward in the centre of the tube, whilst on each side a clear space is left, only filled with *liquor sanguinis*, and a few lymph corpuscles. There are evidently two currents, the centre one very rapid, that at the sides (in the lymph spaces, as they are called,) very slow. The yellow corpuscles are hurried forward in the first, occasionally mixed with some lymph corpuscles. These latter, however, may frequently be seen clinging to the sides of the vessel, or slowly proceeding a short distance down the tube in the lymph space, and then again stopping. Occasionally they get into the central torrent, when they start off with great velocity and accompany the yellow corpuscles. When the capillaries enlarge, however, the central column may be seen to enlarge also, and gradually approach the sides of the tube, thus encroaching on the lymph spaces. The slower the motion of the blood, the closer they come, until at length they reach the sides of the vessel, and become compressed and

changed in form; the vessel now is completely distended with yellow corpuscles, the original form of which can no longer be discovered. Thus congestion is occasioned.

If the morbid process continue the vessel may burst, causing hemorrhage, or the serum and *liquor sanguinis* become effused into the surrounding textures. The exudation of the latter constitutes the essential phenomenon of inflammation. Before, however, proceeding to a consideration of this, let us inquire into the supposed causes of the previous phenomena, or what is usually denominated the *theory of inflammation.*

The whole of this subject has been rendered exceedingly complex and difficult, not only from the numerous theories advanced, but from the many false facts by which some of these have been supported. Within the last few years, also, such great advance has been made in our knowledge of the minute structure of different organs, of the functions they perform, and of the operations of the nervous system by reflex action, that a review of the whole seems necessary. Such is my object with respect to this part of the subject, and I need only premise that it is not so much novelty, as condensation and clearness, which will be kept in view. In the account to be given I shall in a great measure follow the views of Alison and Vogel, more especially of the latter.

The first anormal change in inflammation discoverable by the microscope is without doubt contraction of the capillaries, whilst the blood flows through them more rapidly. Here the following reflections naturally arise. The diminution in the calibre of the capillaries must be caused either by the contractility of their walls primarily, or by the contraction of the parenchyma which surrounds them. In the latter case they would be narrowed secondarily.

Now it is difficult from observation to separate with precision one of these processes from the other. The walls of the capillaries are so intimately connected with the surrounding parenchyma, that it will be evident contraction of the capillaries must necessarily draw the parenchyma after it, and, on the other hand, contraction of the parenchyma must occasion diminution of the calibre of the capillaries.

An observation of what occurs in lax parts, where the parenchyma and vessels are not so intimately connected, as in the vessels of the mesentery, supports the view of inherent contractions in the capillaries. At least it cannot readily be understood how, in a membrane so delicate, where the parenchyma is so loose, its being primarily affected, can produce the regular contractions observed in the vessels. This view is strengthened if the ultimate structure if the capillaries be really identical with that of non-voluntary muscle found in other tissues, as previously stated. This would readily explain the well known fact of the capillaries being more

contractile than any other portion of the vascular system,—a circumstance otherwise certainly very mysterious.

On the other hand, many observations support the view that diminution in the calibre of the capillaries depends upon contraction of the parenchyma or structures which surround them. For instance the corrugation of the skin, the so-called *cutis anserina*, from the application of cold. Here evidently not only are the capillaries contracted, as is proved from the paleness of the skin, but also the elementary fibres of the skin itself, which, by their pressure on the hair bulbs, may occasion this phenomenon. Here we cannot suppose that contraction of the capillaries alone would be sufficient to drag mechanically the primitive filaments of the parenchyma, which so curiously interlace the hair bulbs. Every one who has microscopically examined the skin, and convinced himself of its great elasticity, will certainly share this opinion.

Very probably, then, both causes may act sometimes separately, sometimes together, and we may state that "diminution in the size of the capillaries follows either from an inherent contraction of their walls, or secondarily, as the result of contraction in the parenchyma of an organ, or lastly, from both these causes together." (Vogel.)

The next question that arises, is, how are these effects in their turn produced? In reply the following reflections suggest themselves.

The causes producing the contraction of the capillaries, whether acting upon the vessels themselves or upon the surrounding parenchyma, operate either directly or indirectly. If directly upon the tissues, they may be purely mechanical, purely chemical or purely vital. If indirectly, it is through the medium of the nervous system, and thus the causes may act directly by means of the peripheral nerves, or indirectly, that is, by reflex action. Let us now examine how far facts indicate which of these views is correct.

We observe paleness or contraction of the capillaries to be caused in man by purely mental causes, such as anger, disgust, fear, or anxiety. In such cases a local operation of the causes on the nerves of the periphery, or on the vascular walls or parenchyma, is not to be thought of. The cause here evidently originates in the nervous centres, and acts secondarily on the nerves distributed to the vascular walls or parenchyma. It must also be evident that the change thus occasioned must be in its nature *vital.*

But the same effect is produced by the topical application of cold and reagents, such as vinegar, or by friction. Either of these can produce paleness of the skin. Here, then, if any effect be produced on the peripheral nerves it is not reflex but direct.

But it may be contended that the effect so occasioned is of a chemical or mechanical nature. But observation tells us that the contraction is followed by dilatation. Now it is impossible that

the same stimulus, if it act by physical laws, should produce two opposite results, first contraction and then dilatation. Thus, then, we are necessarily led to the conclusion, that the contraction of the capillary vessels preceding inflammation is in its nature *always vital.*

With the contraction of the capillaries we have seen that there is also a more rapid current of blood through the vessels affected. This may be explained on the hydraulic principle, that when a certain quantity of fluid is driven forward with a certain force through a tube, and the tube is narrowed while the propelling force remains the same, the fluid must necessarily flow quicker. The value of this explanation, however, is lessened on regarding the collateral circulation. The resistance to the flow of blood in the narrowed vessels will, according to physical laws, be so much the more the greater the swiftness and the narrower the tubes. But those capillaries which are not affected, as they offer less resistance than those which are, must proportionally receive more blood than formerly, whereby necessarily the swiftness of the current of blood in the surrounding vessels must be diminished. The influence thus produced, however, cannot be estimated, and we are therefore compelled to conclude that the increased swiftness of the current of blood in the contracted capillaries is the physical result of a narrowing of their calibres.

We have now to inquire what are the causes producing enlargement of the capillaries, and a slower movement of the blood in them—constituting congestion.

It is a widely spread opinion, that in congestion the affected parts have more blood conducted to them than natural. But this view cannot be supported by direct observation, which only warrants our stating that the affected part *holds* more blood than usual, not that an increased quantity of this fluid passes through a given part in the same space of time. On the contrary, observation tells us that the blood in enlarged capillaries flows slower than natural, and thus opposes rather than favours the hypothesis of determination.

It is true, however, that the pulse of arteries leading to inflamed parts is fuller and stronger than natural, and that it must consequently receive and transmit more blood than in a normal state. But observation at the same time shows that the increased beating of particular arteries does not in general precede the congestion, but follows it. Although, therefore, this increased arterial action may keep up and augment a congestion once formed, it cannot be considered as its first cause. This phenomenon, which has been considered the proof of increased determination, is most probably then a propagation of the state of the capillaries to the arteries—is secondary and not primary.

That dilatation as well as contraction of the capillaries depend

upon their possessing an innate vital action, may be proved by nearly the same arguments. For instance, it may be caused by mental emotions, as shame, joy, anger, and the like, and may, therefore, under certain circumstances, be dependent on the nervous centres. It may also be produced by the topical application of heat, friction, and chemical stimulants. That these act, however, on the vital properties of the tissues and not physically, is proved by the paleness and vascular contraction they first occasion. Here, again, as no physical cause by its continued operation can produce two opposite effects, the phenomenon must be vital. It may therefore be said, that "the dilatation of the capillaries in congestion is an innate vital action of these vessels, resulting from causes acting upon the nervous system, either direct on the peripheral nerves, or indirect from the nervous centres—possibly also, upon a direct operation of the cause upon the vascular walls." (Vogel.)

The slow movement of the blood in congestion is explained by the same physical law as is applicable to its increased rapidity. For the same reasons that, when the calibre of the vessel is diminished, the current is quick, so when it is enlarged the current must be slow. In the same manner also, the collateral circulation and the increased determination in the neighbouring arteries which subsequently arises can only allow the physical cause to operate to a certain extent. Other influences come into operation which affect its movement, as we shall immediately see.

Now, if we compare the narrowing and dilatation of the capillaries with the phenomena occurring in muscular parts, we need not wonder that Cullen and others should have dwelt so much upon the doctrine of spasm of the extreme vessels. In muscles we see relaxation taking place as a natural result of spasm, and what occurs in the capillaries is identically the same. Moreover, the action in both cases is produced by similar causes, that is, may depend upon local irritation, or reflex action through the medium of the nervous centres.

It may be said, therefore, that congestion is owing, first, to the operation of a diseased cause, producing transient spasm, then relaxation or paralysis of the capillaries. In many cases, however, the spasm soon passes off, or is entirely wanting, and relaxation or paralysis appears at once. In this way all the phenomena of congestion are readily explained, the increased determination of blood consisting only in the propagation of the relaxation to the arteries.

The next series of changes which require explanation consists of the oscillation in the column of blood, the encroachment on the lymph spaces, complete repletion of the vessel, with blood globules, and lastly, total cessation of all movement.

It is very difficult to determine the cause of oscillation in the

column of blood. It may be remarked, however, that this phenomenon has only been observed in the smaller animals, which are held fast under the microscope. Even here the oscillation is not invariably seen to precede the stoppage. It is most frequently observed, also, when the animal is very weak, or has fallen into asphyxia. Under such circumstances the energy of the heart and large vessels is evidently diminished, and the blood will be propelled with less force than usual against the capillaries, and either stop for a moment, or flow backwards during the diastole of the heart. It is probable, therefore, that the oscillation does not essentially belong to inflammation, but rather depends upon the general weakness of the animal. This opinion is strengthened by a fact I have frequently observed, viz. that, if whilst examining the circulation in the web of the frog's foot, the animal struggle violently, the motion of the blood is arrested. As the animal recovers from the exertion, the circulation is again gradually re-established, the column first oscillating, and then running in a continuous stream. This is more apparent if the subject of experiment be young.

Let us now inquire the cause of stoppage of the blood. It is of great importance that this should be determined correctly.

We have seen that dilatation of the capillaries can only explain the retarded movement of the blood by physical laws. Dilatation of these vessels alone cannot, without the operation of other causes, produce stoppage, for should the tone of the arteries be lost, yet the heart and large trunks would still possess sufficient power to carry on the circulation. Besides, we have seen that the relaxed arteries in the neighbourhood of the affected part receive and conduct more blood than usual; a circumstance which should prevent retardation of the current did it depend merely on physical laws. Hence, it cannot be conceived how simple dilatation of the capillaries can induce a stoppage of the blood.

This effect has been attributed to obstruction. In a dilated capillary it is possible that there where only one blood corpuscle passed, now more, two or three abreast may pass; that these, by pressure, may receive a flattened form, and thus become wedged together, so as to produce a mechanical obstruction to the currents, which, once produced, may extend further. This mode of explanation, however, is opposed to observation; for 1*st*, The stoppage of blood does not, as is supposed, proceed from one point; it takes place over a portion of the capillary system more or less extensive at the same time; 2*d*, The lymph space near the walls of the capillaries is still evident when the blood moves slowly, and only disappears after the stoppage has taken place. Now, did obstruction arise from wedging of the blood corpuscles, it ought to be the reverse. *

* Whilst these pages are going through the press, I have seen the "Principles of

We cannot, then, attribute the stoppage to this mechanical cause. No doubt, however, when once produced, it may tend to keep up the obstruction. It then becomes passive, and resembles mechanical and other forms of obstruction by simple pressure.

Again, the stoppage has been attributed to an impediment to the return of the venous blood. But such an opinion is also opposed to observation; for, 1*st*, veins which come from inflamed parts allow, as far as can be ascertained, the same quantity of blood to pass as usual; 2*d*, the venous ends of the capillaries and smaller veins are rather widened than narrowed in inflamed parts, and it is not to be conceived what circumstance should impede the backward flow of the blood in those vessels; 3*d*, observation shows that, when a true stoppage takes place from impediment in the veins, the phenomena are quite different from those in inflammatory obstruction. For instance, when abdominal tumours press upon and obstruct the large venous trunks, we may certainly have effusions of serum, constituting œdema, but none of the phenomena of inflammation. Thus, then, the cause of stoppage cannot be sought for in the veins.

Now, as it has been shown that the power which retains the blood does not consist in material impediments, there only remains to be advanced, that the phenomenon is vital, depending upon an increased attraction between the blood and the surrounding parts.

This increased attraction can only originate in a change of the vital force. 1. of the blood; 2. of the surrounding parts; and 3. of both these elements together.

It may be objected to the view which places the change of vital force in the blood, that, if this be the cause of stoppage, why should not the effect be more universal. Again, if the blood in inflammation be always affected so as to cause stoppage in the capillaries of a part, then we must suppose that the whole mass of blood is influenced by the smallest wound, such as that made by a razor for instance, which would be eminently absurd. We are not warranted, therefore, in ascribing the cause of stoppage to the blood alone, and although changes do occur in its chemical constitution, facts prove that this is often confined to a very limited portion.

In the same manner it may be shown that although as we have seen the vital properties of the parenchyma are undoubtedly affected in inflammation, the cause of stoppage cannot be exclusive-

Medicine," just published by Professor Williams of London. I find that he confirms the observation of Mr Addison, viz. that the number of lymph corpuscles may be increased within the vessels of the frog's web, by irritation. He conceives that these corpuscles, assisted by diminished elasticity of the vascular walls, produce the obstruction, (p. 214, par. 419.) Without denying the occasional accumulation of these lymph corpuscles in certain vessels, I must record my conviction that inflammation, accompanied by complete obstruction, may be frequently occasioned independent of any such phenomenon.

ly attributed to the attraction it may be supposed to exert. Let us remember the researches of Andral, Gavarret, and Simon, who have shown that in acute rheumatism, and pleurisy for instance, the blood contains an increased quantity of fibrin. Now, when we consider with what facility in acute rheumatism inflammation in the different joints is occasioned from very trifling causes, we are certainly warranted in ascribing a portion of the morbid influence to the blood. The same holds in every case where we seek the cause of inflammation, as has been done for a long time in what is called an inflammatory diathesis.

We are, therefore, compelled to conclude, that the most satisfactory theory which can be advanced explanatory of the facts we have described, is one which conceives the existence of an increased mutual attraction between the blood and surrounding parenchyma. Hence may be explained the gradual approach of the blood corpuscles to the sides of the vessels; the encroachment on the lymph spaces and subsequent stoppage, the effusions and exudations, where the fluid portions of the blood are drawn through the capillaries, sometimes causing them to crack, and the blood corpuscles to extravasate.

This view of the increased attraction between the blood and parenchyma, should it be only regarded as mere hypothesis, appears, at least, to be forced on us by a certain necessity. It must only be regarded as a short mode of expressing facts, in the same way that we make use of attraction and repulsion to express electrical phenomena, or of gravitation to explain a variety of physical facts. We should also remember that a theory in science can only be considered as correct or useful when it embraces every known fact. If it do this it serves as a principle or guide, which enables us to group together isolated phenomena without fatigue to the mind. We hope that the discussion we have entered into, though it necessarily consists of close reasoning, sufficiently exhibits that we have attained this end, and that the early phenomena of inflammation may be ascribed, 1*st*, to a vital contractility and relaxation of the capillaries, analogous to, if not identical with, spasm and paralysis in muscles; and 2*d*, to an increased attraction between the corpuscles of the blood and the surrounding parenchyma.

V. The essential Phenomenon of Inflammation.

Hitherto we have described a series of actions succeeding one another, commencing in contraction of the capillaries, and terminating in the escape of the blood or portions of it into the surrounding tissues. All these actions, however, are not equally important, nor do they all constitute inflammation. Up to a certain point this pathological state cannot be said to exist. The contraction and dilatation of the capillaries, the quick or slow move-

ment of the blood, and even its stoppage, do not constitute inflammation. We frequently see these occur and pass off rapidly without causing any local or constitutional disturbance. Viewing the whole as a series of actions, we may readily understand that the process may stop short at any given point, and then return to its normal state. This, indeed, is the case. When that stage where the vessels are dilated and gorged with blood, and its movement is arrested or nearly so, has arrived, it is denominated congestion. This may terminate in the extravasation of blood, the effusion of serum, or an anormal exudation of *liquor sanguinis.* But it is only when the latter takes place that we can state positively our conviction of the presence of inflammation. Hence it may be denominated the essential phenomenon of inflammation. Let us, however, examine more closely each of these occasional results of congestion.

Extravasation.—On examining the circulation in the tail of a living tadpole with a microscope, it will be seen, on the addition of acetic acid, and sometimes without, that, when the vessels are enlarged, the blood oscillating and about to stop, that many of the capillaries break in one or more spots. This often takes place in a stellate manner, and the blood escapes and collects in the form of a round button more or less large. The tail, if examined by a simple lens, will exhibit very minute red spots scattered here and there, and where these have apparently coalesced, the hemorrhagic spot will be more extended and irregular in form. In this case the congestion has terminated in hemorrhage. In man we see a similar evidence of a like extravasation in the bloody sputa of individuals attacked with pneumonia. In very acute inflammation of the brain also, we often find acute softening more or less connected with similar extravasations, which are then denominated capillary apoplexy. We have every reason to suppose, that in these latter cases, as well as in the tail of the tadpole, the extravasation arises from overdistension and rupture of the capillary vessels.

It can scarcely be conceived by any one who has carefully examined the blood-globules on the one hand, and the structure of the capillaries on the other, that the former can transude through the walls of the latter without rupture. Such an opinion may be considered as pure hypothesis, only supported by negative arguments. No one has ever seen such an occurrence. All positive observation indicates that, when transudation of blood really occurs, as in purpura, hemorrhagic diathesis, &c. the blood-globules are no longer in tact, but more or less broken down, whilst numerous granules are found in the fluid.

A very important question to determine is, how far such capillary hemorrhage is to be considered a proof of inflammation? We cannot suppose that the function of menstruation is a periodic inflammation, although undoubtedly the phenomena accompanying

it are often nearly identical with those accompanying a genuine metritis. Local pains, accompanied by great constitutional disturbance, full pulse, hot skin, thirst, and all the symptoms of pyrexia, including relief from bleeding. Again, congestions recurring suddenly in the brain often produce capillary apoplexy and rapid death, the same as when a large vessel has been ruptured. But here again there is no evidence of inflammation, or of the existence of those symptoms which practical men have long attributed to cerebritis.*

Whilst, then, we know that capillary hemorrhage or extravasation of blood may occasionally accompany inflammation, we must deny that that circumstance alone is a proof of its existence.

Effusion.—That effusions of serum are induced by injuries and applications which excite inflammation cannot be doubted. The application of a blister is a ready means of producing this result, and, it may further be well observed, in vesicular diseases of the skin. Effusions no doubt are very common, but, in the great majority of instances, they arise from venous obstruction, altogether independent of inflammatory phenomena. Enlargements of the liver, pregnant uterus, abdominal tumours, &c. produce ascites from interrupting the venous circulation, and diseased heart or lungs occasion anasarca for a like reason. Here certainly the effusion is not inflammatory. In all such cases the fluid is clear, holds no fibrin in solution, and on being evacuated shows no disposition to coagulate. In inflammatory effusions, on the other hand, the fluid is more or less turbid, containing fibrin in solution, and, if allowed to stand, flocculi swim in it or sink to the bottom of the vessel. If we allow the vesicle in a blister to remain, we shall gradually see the fluid become more and more opaque. Even vesicular diseases of the skin induce exudation of blood plasma and a subsequent formation of pus, or produce scabs and crusts more or less thick, from the fibrin they contain drying on the surface. In short, in no case is it possible to procure pure serum, that is, serum unmixed with fibrin, as a result of inflammation. Hence, then, a great distinction between passive and active effusions, between venous and capillary dropsies.

Why it should happen that venous congestions are never accompanied by an exudation of blood-plasma, whilst arterial congestions are, is a point that no one has yet endeavoured to explain. To me it appears certain that all inflammatory effusions occur through the capillary or intermediate vessels, and not in such vessels as may be properly called arteries or veins. The vein is a very compound structure, and when distended to the utmost only permits the more fluid portions of the blood to pass through. The capillary vessel, on the other hand, is a most simple struc-

* See Journ. No. 157.

ture and exceedingly delicate, so that when distended we may readily understand that it admits not only the serum but the more inspissated *liquor sanguinis* to pass through also. But it is scarcely possible to suppose that the mechanical difference in the tenuity of the filtrating membrane should constitute the only distinction. It is impossible to reconcile the phenomena without having recourse to some active vital power of attraction between the blood and parenchyma, as formerly explained;—a power which, operating in the one case and not in the other, causes different constituents of the blood to become exuded. We are compelled, in all our considerations of the subject, to go back to this explanation, as to an ultimate fact.

Mere effusion, then, cannot in itself be considered as characteristic of inflammation. It may be the result of congestions non-inflammatory, or, if otherwise, passes more or less into exudation, which we shall now proceed to consider.

Exudation.—In every instance of undoubted inflammatory action an exudation of blood plasma occurs, which may be made visible. We have just alluded to this in connection with the subject of effusion,—a word which is often used synonymously with that of exudation. Thus we talk of pleuritic effusion to express an exudation of blood-plasma into the cavities of the pleura. In such situations where the *liquor sanguinis* is poured out into shut cavities nearly the same phenomena occur as when blood is drawn from the body. The fibrin coagulates and the serum is set free. The former then lines the serous membrane, and is denominated coagulable lymph, whilst the latter is called serous effusion. This is identical with the serum effused in passive congestions, but, unlike it, was separated from the vessel in the form of *liquor sanguinis*, that is, holding fibrin in solution.

In parenchymatous tissues, however, as in the lungs, liver, brain, &c. the structure of the parts will not allow of this distinct separation. The *liquor sanguinis* exuded is, of course, at first fluid, and, in this state, insinuates itself amongst the elementary structure of the organs, filling up every minute space. When it coagulates, the tissues of the part affected are completely blocked up as if with cement. The blood-vessels, nerves, filaments, &c. are surrounded by a solid mass, in the same manner that the stones in a wall are surrounded by mortar. Hence increased hardness, density, and weight are communicated to such structures, constituting that state called hepatization, splenification, condensation, &c. Occasionally the *liquor sanguinis* seems to have the power of remaining fluid for a length of time without coagulating. Thus, Vogt relates a case where, on slicing the brain, a cavity the size of a walnut was cut across, from which a transparent fluid came out that afterwards coagulated. Nothing also is more common than

to find effusions into the pleura or peritoneum, which, although fluid on first opening the body, afterwards become turbid and are seen to contain flocculi.

Exudation of blood plasma, then, is essential to inflammation. We have seen that congestion may terminate in hemorrhage, or in effusion without constituting inflammation. But whenever it terminates in exudation of blood plasma, that morbid process may be said to exist. We do not possess any other positive proof of the presence of inflammation than this, and by regarding exudation as the essential phenmenon, we at once give precision and exactitude to the term, and separate it pathologically from other morbid processes with which it has no affinity.

According to the ideas at present entertained respecting inflammation, exudation, instead of being considered as essential to that process, is rather regarded as one of its terminations. That is to say, pathologists conceive inflammation to consist of what we have called the early phenomena, which, according to them, are usually indicated by pain, heat, redness, and swelling. By adopting this view, however, they are plunged into a crowd of inconsistencies. They are unable to separate congestion from inflammation, or to explain any one phenomenon of the process. In point of fact, they confound the congestion leading to inflammation with the inflammation itself, and ascribe those symptoms to the former which in reality belong to the latter.

These symptoms, indeed, of pain, heat, redness, and swelling have been made to play too important a part in our views concerning inflammation. They are only present when the lesion affects the external surface, and are by no means applicable when it attacks many internal organs. I have seen cases of encephalitis where no pain or heat was manifested before death, and where no redness or swelling was to be afterwards discovered, although an undoubted inflammatory softening existed. Inflammation, also, may attack the lungs, liver, kidneys, &c., and yet one or more of these supposed cardinal symptoms be absent. Again, slight incisions, as those with a razor, are generally supposed to heal by means of inflammation, and so they do, but where is the pain, heat, redness, or swelling? In short, the symptoms of phlegmon, which so frequently come under the notice of surgeons, have been by them too generally applied to all inflammations. An analysis of these symptoms, also, will show that, whilst some depend upon the previous congestion, others are attributable to the exudation which follows it. Thus, the heat and redness are caused by the former, whilst the pain and swelling usually result from the latter. The presence of these symptoms, therefore, cannot be considered as essential to inflammation, whereas this state can never exist, however slight or however severe, without exudation of blood-plasma.

Other pathologists have felt the difficulties which attend the

considering exudation as a result rather than as the essential phenomenon of inflammation. Thus Dr Alison observes, " in order to give the requisite precision to the general notion of inflammation as a local change of the condition of any part of the body, it seems only necessary to include in it, besides the pain, swelling, heat and redness, the tendency always observed, even when the changes in question are of short duration, to effusion from the blood-vessels of some new products; speedily assuming, in most instances, the form either of coagulable lymph or of purulent matter.* If, instead of " tendency to," we read *existence of*, effusion, the principle laid down is certainly correct. Yet only to exhibit the inconsistencies which attend the present method of regarding inflammation, let us observe what is stated by Dr Symonds in the same volume, and in the article preceding the one just cited. He says, when speaking of purulent secretion, " purulent matter may be found in masses of various dimensions in the substance of the lungs, the liver, and other organs, notwithstanding there may have been no symptoms of inflammation in these parts during life, &c." " We cannot doubt that this deposition" (that is purulent matter) " may exist under circumstances which forbid our supposing that the organ in which it is found had been affected with inflammation, &c."† Here, then, the very circumstance which Dr Alison has considered necessary to give precision to the term inflammation, is acknowledged by Dr Symonds as capable of existing without that process. Again, whilst some modern surgeons are of opinion that it is impossible for the smallest wound to unite without inflammation, (Astley Cooper,) others contend that it is opposed to adhesion or regeneration of parts, (Macartney.) These and various other discrepancies are at once removed by considering an increased exudation as the essential phenomenon of inflammation.

When the *liquor sanguinis* is exuded, it generally coagulates and constitutes a foreign body in the texture of the parts affected, which it becomes the object of nature either to remove from the system, or so to modify that its presence may be rendered conducive to the wants of the economy. For this purpose it undergoes certain vital changes, which differ in particular situations, and under certain circumstances. It serves as a blastema in which new organisms, that is, nucleated cells, are originated and developed. By means of the new growths thus produced, the exuded blood plasma becomes converted into a variety of products, which are ultimately reabsorbed into the circulation, discharged from the body, or changed into permanent tissues. Occasionally, however, the exuded blood plasma undergoes no such changes, it seems to lose its vitality, and is rendered incapable of either becoming absorbed,

* Lib. of Med. Vol. i. p. 53. † Ib. p. 24.

of passing into nucleated cells, or permanent formations. Under these circumstances, the blood plasma effused, and the textures loaded with it, lose their vitality and die. All these various changes, which we shall next proceed to consider, may be denominated, in the ordinary language of pathologists, the terminations of inflammation.

(*To be continued.*)

ART. III.—*Case of Tubercular Elephantiasis in a man of English parentage, born in India.* By J. KINNIS, M. D., Surgeon to the Forces. (In a Letter to Sir James M'Grigor, Bart., Director-General of the Army Medical Department, &c. &c. &c.)

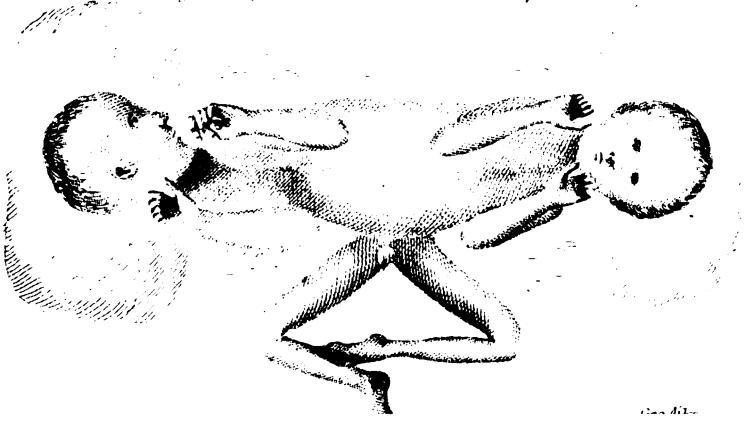
SIR,—IN a paper addressed to you, which was published in the Edinburgh Medical and Surgical Journal for July 1842, I gave examples of tubercular elephantiasis occurring among the inhabitants of Madeira, of Portuguese or mixed origin; the French creoles, Mozambique slaves, and offspring of French fathers and Malgashe mothers inhabiting the Mauritius; and the Singhalese, Moors, Tamuls, Malays, and offspring of Singhalese mothers by Portuguese-descended and English fathers inhabiting Ceylon.

In further illustration of a disease so rarely seen in this country, and of which the causes, pathology, and treatment are so imperfectly known, permit me to offer, for your perusal, and for publication afterwards in the work containing my former observations, an example of its occurrence in a man of English parentage, born in India, being the only one I have witnessed, in which both parents were natives of any part of Europe. It is accompanied by a coloured drawing, for which I am happy to acknowledge my obligations to Mr Ford, a gentleman with whose merits, as a zoological and pathological draftsman and lithographist, you must be well acquainted. (See Plate I., Figure 1st.)

Serjeant William Bibby was born in Bangalore, of English parents, both natives of London, in July 1808. His father being a serjeant in H. M. 38th Regiment, he enlisted in the same corps in 1825, and has now served eighteen years, namely, ten in India, nearly five in the united kingdom, and two years nine months in the Mediterranean. He was promoted to his present rank in January 1828, and embarked at Calcutta for England in December 1835, having spent the first twenty-seven years of his life in excellent health in India. He arrived in England in May 1836, and went to Ireland in June or July 1837. In the end of 1838, he got thoroughly wet in marching from Dublin to Enniskillin, and went into hospital with a severe cold in the head, which

Fig. 1 Dr. KINNIS's Case of ELEPHANTIASIS p.54.

Fig. 2 Mr. Perrin's Case of Monster p.58.



kept him there ten days or a fortnight. At Belfast, again, in 1839, after marching from Newry, he had a similar attack, ascribed to a similar cause, for which, also, he was treated in hospital. He embarked for the Ionian Islands in September 1840; spent fourteen months in Zante, fifteen in Corfu, and two in hospital at Gibraltar on his way back to England. He arrived in Zante twenty-five days before a violent earthquake, which visited that island on the 30th October 1840, and which, among other testimonies to its severity, left the military barracks uninhabitable. The first following eleven nights he had to sleep in the open air, and, during his remaining stay in Zante, was quartered in a hired house, totally out of repair, and admitting the wind and rain in all directions. In November 1840, the right side of his face became red, swollen, and painful; the swelling increased and diminished with the vicissitudes of the weather, but never entirely subsided; was sometimes accompanied with ophthalmia closing the eyelids; at last assumed an uneven and knotty form, and attacked likewise the left cheek. From its first appearance in November, he was rarely free from a cold and stuffing in the head, hoarseness, chilliness, and rheumatic pains, yet he did not go into hospital until July 1841, when, in very sultry weather, and after habitual constipation, he was admitted for a week, with anorexia, nausea, and vomiting. He went to Corfu in December. He first observed discoloured swellings on his arms and thighs in March or April 1842; but was able to do his duty up to August, when he was admitted the fourth time into hospital, and remained until his regiment embarked for Gibraltar in March 1843; continued in hospital there from April to June; arrived at Fort Pitt on the 7th July, and underwent palliative treatment only until the 22d September, when he was discharged as an out-pensioner of Chelsea Hospital. He takes his departure to-morrow for Jersey, which he has selected as his future residence.

His complexion is not darker than that of Englishmen in general, who have resided in the tropics; his hair is blackish brown, abundant on the head, and hardly if at all deficient on the eyelids, axillæ, and pubes. Though he is in the habit of shaving every fourth day, a few distant, silky hairs are the only representatives of his beard; and under the inner extremity of each eyebrow is a small thin tuft, the rest being quite bare, wrinkled, and swollen. The whiskers are moderately luxuriant over about one-half of the surface they ought to cover, the other half being studded by bare tubercular elevations. The parts of the body chiefly affected with tubercles are the face, upper limbs, hips, and thighs. The skin covering the cheek bones and bridge of the nose, with two oblique ridges which connect the former to the latter, is red, glossy, thickened, smooth, uneven or undulated, and overspread by small se-

parate webs of superficial blue veins; there being one on each cheek, and one on the nose, ramifying chiefly on its right side. The lower parts of the face are occupied by two large imbedded clusters and several distinct tubercles, rising little above, and corresponding nearly in colour with the natural skin: at each angle of the mouth are two, under the nasal partition one, and on the chin another, the two last being of a pale blue colour from superficial veins, of which also, one passes into and along the floor of each nostril. The nose, though convex perpendicularly as well as transversely, is low and broad, the tip and left wing are bounded above by a slight depression, on the left by a deep groove, with a tubercle the size of a small pea at its summit, and on the right by another groove which surrounds the right wing—shrunk to half its natural size, and closing like a valve the corresponding nostril. The left nostril is of a square form and moderate size. There are no tubercles within the mouth, or on the ears, but the veins of these are very conspicuous. Beneath the chin, on the mesial plane, is a cluster of imbedded tubercles.

On the middle half of the back and outside of both arms, the skin is irregularly thickened, indurated, dry, dark, and glistening; between the condyles are smaller similar patches, and over the deltoid and biceps muscles, the back and outside of the fore-arms, right wrist, and metacarpus, are clusters and chains of bluish-red slightly raised, oblong tubercles. The backs of the hands, wrists, and fingers are dry, glossy, wrinkled, and the lozenges of the cutaneous surface converted into large shallow cells, with ridges of doubled cuticle between them. The cuticle of the palms is thick, rough, dry, and in progress of separation, in opaque white scales.

While yet in Zante in 1841, the point of his right fore-finger became red, swollen, painful, and, after the application of poultices, discharged first matter, then several pieces of bone, and in due time healed. Nearly the whole of the distal phalanx of this finger is now wanting, but the nail remains, shortened by one-third, divided into three unequal portions by longitudinal ridges, and drawn obliquely forwards over the end of the stump, which presents a small triangular scar. The middle phalanx may be bent, but cannot be completely extended. This finger has so entirely lost its sensibility, that it may be pressed or pricked when his eyes are shut, without his being aware of the contact of a foreign body. The skin of its metacarpal bone, and of the rest of the hand, is greatly benumbed, and the muscular power so much impaired, that he can neither clench his fist nor grasp any object firmly; while the sensibility and muscular power of the left hand are equal to those of other healthy parts. The nails of the right hand are short, fluted, and so very brittle as to render paring unnecessary; while those of the left have a normal appearance.

The trunk is very greatly emaciated, and, though the skin covering it exhibits several large white patches, such as are often seen in healthy Europeans, who have served in the tropics, it appears to be everywhere sensible, perspirable, and sound.

Tubercles exist in considerable numbers on both hips and on the back, front, and inside of the thighs, generally flat, oblong, imbedded, of moderate size, and a pale-bluish colour. There are also one or two on the right knee, one or two on the upper and outer parts of both legs, and three, two of which coalesce into one, near the inner edge of the left tibia. The last are covered with white scars. The skin on the back, and slightly on other parts of the legs, and on the ankles and feet, is thickened, indurated, and benumbed; the cellular membrane œdematous; the cuticle dry, rough, thickened, cracked, and peeling off in opaque white narrow shreds, or giving passage to a serous discharge from the true skin. The toes are smooth, swollen, shining; the nails convex from behind forwards, thickened and subdivided into layers, from which transverse segments have been broken near their roots, and thrown off.

Immediately under the right groin are two enlarged glands, each above half-an-inch in diameter, and, somewhat lower down, a third, nearly two inches by one in size. Below the left groin is a less prominent glandular swelling.

He had lost all sexual desire some months before his admission into hospital in Corfu in August 1842, and the testicles are small, though not much wasted. His general health and strength are greatly reduced; the emaciation of his trunk is much more considerable than could have been anticipated from the mere inspection of his face and limbs; yet there is no reason to suspect organic disease in either the chest or abdomen. By the aid of a staff he walks about; but with pain, difficulty, and dyspnœa. His height is 5 feet 9 inches and a-half. In his clothes he weighed

	Stones.	lbs.
Before leaving India, . . .	10	0
In Ireland, 1838, . .	9	10
At Fort Pitt, 22d September 1843,	8	2½

Deducting his hospital dress, which weighs six pounds, his present weight, therefore, is 7 stone 10½ pounds. In the recumbent posture his pulse is from 95 to 100, and respiration 21 per minute; in the sitting posture the former is 120 and the latter 31. His tongue is tolerably clean; appetite impaired and capricious; thirst constant; bowels habitually confined. The mutilated finger is the only utterly insensible part; but all the tubercles and the thickened skin are benumbed, and their sensibility impaired. The part corresponding to the passage of the ulnar nerve, behind the internal condyle of the left arm, is exquisitely

tender and painful on pressure. He is keenly sensible to impressions of cold air; suffers much and constantly from pain in the feet and ankles, shooting up to the knees, and depriving him of sleep in the night, and these parts are painful to the touch. He rarely sleeps more than four hours, even with an anodyne draught; is awoke by the slightest noise, and perspires profusely in the night. During hot weather he perspires also in the day; the tubercles increase in redness and in size, and become the seat of "burning pain." His voice is slightly hoarse and nasal, and he is subject to epistaxis; but has never lost any pieces of bone from the nose. At uncertain intervals, probably averaging once a fortnight. he has a febrile paroxysm, generally terminating on the day of its invasion with copious perspiration, sometimes repeated on two successive days, sometimes lasting forty-eight hours without intermission, and attended by pain, heat, and increased swelling of the feet, ankles, knees, and femoral glands.

He is the eldest of a family of eight; the other seven were females; six died young; one, the next to him in seniority, married, and had children, but lived only twenty-seven years. He himself married in June 1830 the daughter of a staff-sergeant, an Englishman, and has had four children, the youngest born in 1838. One died of cholera morbus at eighteen months; two of water in the brain, at one and five years old. The surviving child, a fine, healthy girl, seven years of age, and his wife, are here with him. None of his relations or connections ever had the disease under which he labours.

General Hospital, Fort Pitt,
Chatham, 26th September 1843.

Art. IV.—*Notice of a Bicephalous and Bisomatous child, born at Galle, in the Island of Ceylon.* By J. A. Pereira, Medical Practitioner, Columbo.

In the year 1841, a monster child was born at Galle, in the Island of Ceylon, of native parents, of which the subjoined sketch is an external delineation. The child was brought from Galle to Columbo and lived two months. The body was examined after death by Mr Pereira, pupil to Mr Misso, a medical practitioner in Columbo, and subjoined is his account of its internal organs. Considering the limited opportunities afforded to the indigenous inhabitants of Ceylon to acquire a knowledge of human anatomy, the description of the monster is highly creditable not only to Mr Pereira, but also to his intelligent master, Mr Misso.

Sectio Cadaveris.—"Having made a longitudinal incision from the top of one sternum carried all along the *linea alba* cros

sing the umbilicus, continued to the top of the other sternum, and made a transverse section from the umbilicus down to the pubis, and brought the cavities into view for a superficial examination. There were in each twin, (though the twins were attached,) the heart and its pericardium, blood-vessels, &c., trachea, right and left lungs, the liver and its gall-bladder, œsophagus, stomach, pancreas, spleen, and duodenum, all the rest of the intestines were of one infant. The duodenum of each terminated in a particular manner, so as to end in one jejunum. From the jejunum the *ileum*, *cæcum*, colon, and rectum were as of one infant. The twins had one vent or anus and one male generative organ. The spine at the lumbar region had a serpentine curvature internally. There were two kidneys, one situated on each side of the lumbar region, and two ureters descending to the bladder."

(Signed) J. A. Pereira.

Columbo, 22d December 1841.

A view of the appearance of this monster is given in Plate I., Figure 2.

Art. V.—*A Case illustrating Peculiar Morbid Phenomena of the Brain, with Remarks.* (Read before the Philosophical Society of Sheffield.) By G. Calvert Holland, M. D., Vice-President, Honorary Consulting Physician to the Sheffield General Infirmary. April 7th 1843.

Richard J., aged 28 years, collier, began work at seven years of age. He enjoyed good health throughout life, except that, six years ago, he had the influenza, and, about six months before his present illness, he was attacked with violent pain at the anterior part of the head, which confined him to the house one week. The pain was then much moderated, and he so far improved as to be able to follow his employment, and continued to do so until about six months ago, when he became much worse. At this time he had not only severe pain in the head, but symptoms of very great disorder in the functions of the stomach. He had frequent belchings, excessively disagreeable taste in the mouth, great lassitude, and drowsiness,—the latter so oppressive that he slept at table during meal times, and the appetite was much impaired. These symptoms having continued about two months, he was then affected, when in a recumbent posture, with an irresistible impulse to talk, and his articulation was exceedingly rapid and indistinct, and his ideas were incoherent and ridiculous.

At this time he often stammered both in and out of bed. He was conscious of an irresistible tendency to talk, and of the absurdity of his remarks, but was unable to prevent either. After these symp-

toms had continued for a short time, his head began to turn rapidly from shoulder to shoulder, and of these involuntary movements he had about four proxysms during the day. The sight was not affected. Touch was natural. The taste was vitiated, apparently from the disordered state of the stomach. The hearing was very much impaired after each attack of the involuntary movement of the head; so much so, that he could not tell what persons said who stood close to him. He has had no involuntary movements during the past month. He was occasionally troubled with stammering, but this is much diminished in frequency and severity.

Previously to the attack of his present disease, he had been working in a very unhealthy pit, containing bad air.

The foregoing is a brief description of an exceedingly rare and interesting case. In consulting the works of distinguished writers who have given an especial attention to the phenomena of the nervous system, as Flourens, Rolando, Magendie, Bell, Lobstein, Marshall Hall, and several others, we do not find one presenting the same phenomena, either from disease or the result of direct experiments. There are cases recorded, offering several analogous symptoms, to which we shall shortly allude.

The individual, the history of whose case is here given, was, in stature, about five feet seven inches; in form rather light, but muscular and active, and in his general conduct had always been unexceptionable. When he came under our care the tongue was slightly furred, appetite defective, bowels confined and irregular. His understanding seemed rather above the average of that of colliers. He described his symptoms with considerable minuteness and clearness. His countenance indicated, however, less intelligence than he possessed; indeed, at times, the expression was, to a slight degree, idiotic, but which changed when excited by conversation. On one occasion, when investigating the case in the presence of the intelligent resident surgeon of the institution, he was seized with one of his usual attacks. The head moved with extraordinary rapidity from one shoulder to the other, executing as large a portion of a circle, as its position and attachments would allow. It was not in our power to count the oscillations. We thought there were above twenty in a quarter of a minute. We did not measure, however, either the time or the number of vibrations. When these had ceased, the countenance was very much flushed, and the individual appeared somewhat exhausted, as well as slightly confused in thought. The stammering was increased by the paroxysm, and likewise the tendency of the mind to repeat twice and three times the same thing, which was quite an involuntary act, and which we have witnessed in one other case, in which there was unequivocal evidence of cerebral disorganization, and which had been induced by disease of several years' duration.

The peculiar phenomena deserving attention in the his-

tory of this case are, 1*st*, the irresistible impulse to talk, and incoherently, the individual at the same time being conscious of his inability to control the impulse, as well as of the absurdity of his remarks; 2*d*, The several paroxysms in the four and twenty hours, in which the head oscillated in the manner described; 3*d*, The tendency of the mind to repeat the same thing several times, independently of any desire of the patient to do so, and which, indeed, was always the most obvious immediately after each paroxysm. The consideration of these symptoms left no doubt on our mind as to the existence of cerebral disease; and the nature of them, enlightened by the experimental researches of physiologists, led us to place them in the region of the *medulla oblongata*.

The treatment which they and other symptoms suggested was constitutional as well as local. The circumstances in which the individual had been placed, previously to this attack, confinement for many hours in a dark and damp pit, breathing a deleterious atmosphere, which was sensibly painful to inspire, and the consequent derangement of the digestive apparatus, impressed upon us the necessity of attending particularly to the condition of the animal system generally. The morbid phenomena of the brain were several months subsequent in their occurrence to the impaired appetite, the exceedingly bad taste in the mouth, disordered action of the bowels, and the feeling of exhaustion. The consideration of the probable exciting causes of these symptoms induced us to regard the head affection as the result of the constitutional derangement, and the directly poisonous influence of the air which had been inhaled for several months. The constitutional treatment for some weeks was the employment of mild mercurial alteratives, with gentle aperients; and afterwards the continuance of the former, with warm tonics. The local treatment consisted almost entirely in the occasional application of blisters, either to the nape of the neck, or behind the ears. Considerable importance was attached to diet, and to regular exercise in the open air. In little less than five months he was quite cured, and resumed his previous daily or nocturnal labours.

This case is fraught with interest to the inquirer into the functions of the nervous system; tending to establish a diversity of cerebral powers. The irresistible impulse to talk, and the incoherence in the ideas expressed, of which indeed the individual was conscious, without being able to exercise the slightest control over either, are curious and rare phenomena. The mind, in this case, or, more correctly speaking, certain mental faculties, by which we observe and reason, were clearly undisturbed in their functions, and were passive spectators of the disordered action.

It is not our intention to speculate on the exact seat and causes of these phenomena; we confine ourselves to the statement of

facts, and leave to others the more difficult task of accounting for what is extraordinary and of rare occurrence. Strong involuntary movements to dart hastily forward, to retrograde, or to turn round, have been observed and described by pathologists, as phenomena occurring in disease of certain parts of the brain; and the same have also been produced by physiologists, in their experiments to determine the functions of this organ. Illustrative of the effects of disease, "Dr Laurent has demonstrated to the Academy of Medicine, a young girl, who, in the attacks of a nervous disease, is obliged to retrograde pretty rapidly without being able to avoid the obstacles or hollows towards which she may be directed; and, consequently, encounters many bruises and falls."* Andral also relates the following case, which approximates in some of its symptoms to the one we have brought under consideration.

"When this girl entered the hospital, she did not appear even unwell. It was observed only that her head was continually agitated, by a movement which carried it alternately to the right and to the left. Her complexion was pale; she eat little; slept well, was free from fever, and did not complain. In this state she continued about fifteen days. Her head was always agitated by the same motion. At that time the symptoms began to be changed. The eye became dull; the lips became pale and dry; she fell into a state of depression, which became more and more complete; and she died without ever presenting either convulsion or palsy."†

In this case it is stated that the head was in continual motion from right to left. The motion is not described as rapid and violent, but simply as a kind of oscillation. In the one, the particulars of which we have given, the vibrations of the head were exceedingly strong, and painful in the extreme to observe,—a marked difference in the character of the phenomena. Serres gives the particulars of a case, in which an individual of dissipated habits was suddenly seized with the feeling that he turned around objects, and not the latter around him, which was immediately followed by his actually turning round. He died in four months after the attack, and, on the *post mortem* examination, these conditions of the brain were discovered.

"The hemispheres of the brain were in their usual state. In the centre of the entrance of the peduncle of the cerebellum into the right hemisphere of this organ, there was an excavation nine lines long, oblique from without inwards, and five lines broad, in its greatest transverse diameter. At the outer boundary of this abscess the white substance had become yellowish and more consistent than natural. The abscess was crossed by a yellowish

* Compendium of Physiology, Magendie: Dr Milligan's translation, p. 191.
† Journal de Physiologie, Tome ii. p. 111.

bridle and divided into two small compartments, one anterior, the other posterior. The posterior compartment, which descended most deeply into the hemisphere of the cerebellum, was filled with matter of the consistence of soup and brown in colour. The anterior cavity was filled with thicker matter of brown yellow, entirely detached from the walls of the cavity. The whole right hemisphere of the cerebellum was more consistent than the left; and the radiations of the white substance had a yellowish tint which was not observed in the radiations of the opposite side. The rest of the annular protuberance, the *medulla oblongata*, and the spinal chord, presented nothing peculiar."*

It appears, both from pathological researches and physiological experiments, that these different abnormal kinds of motion arise from some structural change in the peduncles of the cerebellum, and one part of the *medulla oblongata*. In the case related by Serres, extensive disease existed in the former; and Magendie appears to have satisfactorily established, that any severe injury done to either of the peduncles causes the animal to turn rapidly round, and the motion continues as long as it is unopposed by external obstacles. He also states that movement in a circle, from right to left, is produced by a section of the *medulla oblongata*.

We have nothing further to add to these remarks, concerning the case which was attentively observed by us for the space of five months. Recovery precluded further investigation, which would have been exceedingly interesting to prosecute, and which would perhaps have thrown additional light on the causes of such phenomena. We have confined ourselves to the statement of facts, and we leave these to the consideration of the enlightened inquirer.

Art. VI.—*Observations on the Influence of the Climate of Canada in preventing the Development and stopping the progress of Physical Symptoms.* By J. Orton, Esq. Surgeon, Beeston, near Nottingham.

Some time ago a patient of mine, of delicate constitution, several of whose relations had died of *phthisis pulmonalis*, exhibited symptoms which led me to fear the approach of that insidious disease. I stated my fears to his wife, and mentioning at the same time the high opinion I entertained of the climate of Canada for such cases, founded on information I had received from my brother, Mr Henry Orton, surgeon, practising at Guelph in that province, it was agreed that I should consult a physician who had occasionally attended the patient, on this point. I did so, and

* Anatomie Comparée du Cerveau, Vol. ii. p. 625.

mentioned the accounts I had repeatedly received of the remarkable salubrity of Upper Canada, and its adaptation especially to patients of this description, but the doctor evidently was dubious. He referred to Sir James Clark's work on Climate, speaking of it as one of the highest authority on the subject, and said,—" I do not see that Canada is even mentioned;" and concluded the conversation by saying, " I really cannot countenance the advice you seem disposed to give. The fact is, we, meaning the medical profession, know nothing of Canada." This patient went through a quiet course of phthisis, and died a few months ago.

Now, although my information is confessedly imperfect, being confined almost entirely, as I have said before, to incidental communications, from time to time, from my brother, without any reference to publication, I feel desirous of communicating what I do know, and shall be much obliged, therefore, by your giving this a place in your widely circulating Journal, that the medical public may not be altogether uninformed respecting the claims which, as it appears to me, Canada has on our notice, as a country highly favourable for the prevention of a class of diseases at present so lamentably prevalent, and as lamentably fatal.

The following is an extract from a letter dated December 1836, being the first communication on the subject that I recollect. " I had occasion, a short time since, to call in old Doctor Allen to a case five or six miles off, in the Bush, and we had, on the road, a great deal of professional conversation. Mr Allen had, he told me, when he came out, a letter of recommendation to the Governor, from Doctor James Johnson, Editor of the Medico-Chirurgical Review, who, he said, had written on the excellence of this climate, for all scrofulous and phthisical affections, reckoning it far before the south of Europe, &c. I quite believe he could not well go too far in this particular. It is a certain fact, that a scrofulous or consumptive case is scarcely ever seen in Upper Canada, in any shape. Mr Allen instanced to me several families hereabout, that had emigrated from his own neighbourhood, (Suffolk,) who, in the old country, had suffered severely from consumptive bereavements, and several of them in alarming conditions themselves, when they came out, who had never shown a symptom of the sort, since they came to Canada; and other families who had suffered from scrofulous affections, in various forms, that had never given an indication of it here. I myself have never seen a scrofulous or consumptive case yet." Mr Allen, I may mention, was the principal surgeon at Guelph when my brother arrived, having resided there almost from the first settlement of the place, a gentleman in extensive practice, and much esteemed as a sensible well-informed man, and a good practitioner.

In a letter dated December 1839, I find the following:—"I have written to Mr ———, but do not think, from the accounts I have heard of him, that there is much likelihood of his coming out here. I have, however, done what I consider my duty in the matter, and so must leave it. I am convinced I have not said too much on the dangerous position of one who has been the subject of an attack of hæmoptysis, or have too highly recommended this vicinity for such constitutions. I feel confident in my own mind that there is not, for such invalids, a more congenial climate in the whole world. I have been lately looking over some old Methodist magazines, and it is astounding, on reading the obituary departments, to see the numbers of valuable, and most promising lives, that are continually cut off by consumption, and I frequently think that nearly the whole of these might be saved by a timely emigration to this country." I have only to add, that I have continued to receive precisely similar reports and statements, from time to time, to the present.

About eighteen months ago, my late esteemed friend, Dr Davidson, of Nottingham, showed me a letter that he had then recently received from my brother, in which the same testimony was given respecting the climate of Canada, with this addition, that asthmatic affections ordinarily disappear there on the arrival of the subjects of them; and having just then a patient at Lenton, who had for a long time suffered severely from asthma, the doctor immediately recommended him to try a residence in Canada, which recommendation the poor man was enabled to carry into effect by the assistance of the Misses Wright, of Lenton Firs, who, with their wonted benevolence, furnished him with the means of going. I have since heard from my brother that this man had been residing some time at Guelph, working at outdoor work, chiefly gardening, and that while there he enjoyed good health, and was quite free from his old companion, the asthma, with the exception of one short attack, brought on by allowing his clothes to dry upon him, after working out in the rain one day.

In the spring of last year my sister, Mrs Whitt of Nottingham, who had been subject to bad cough at times for some years, suffered a severe attack of pneumonia, from which she with great difficulty recovered; her recovery, indeed, was very incomplete; for, after the inflammatory symptoms had been subdued, and the immediate danger averted, there continued to remain so great debility and emaciation, together with a very troublesome cough, considerable expectoration, night sweats, &c., as to cause us to feel great alarm for her. In this stage we called in Dr Davidson, who, after a careful examination, considered her in a dangerous state, and gave, altogether, an unfavourable prognosis, but concurred with me in recommending a speedy removal to Canada. The re-

sult has been most satisfactory. It is a short time ago only that I had the pleasure of receiving a letter from Mr Whitt, who was not able to join his wife until this summer, saying, that he found her quite recovered, much stouter, indeed, in good health.

Whether, and to what extent, other localities possess the advantages which seem to appertain to the vicinity of Guelph, remains to be seen; but at present, I confess, I have great doubt on the subject. The great bulk of the population of Canada is located along the margins of the lakes and rivers, and it is well known that many of the settlements are very subject to agues, fevers, bowel complaints, &c., diseases incident to low, marshy, ill-drained situations; but that portion of the province now particularly treated of, and with which alone Mr Henry Orton is practically acquainted, is very differently circumstanced, being a high, dry, undulating region, as remarkable for its salubrity as many of the settlements are, unfortunately, for their unhealthiness.

The Wellington district, of which Guelph is the district town, is altogether an upland district, and forms a portion of what may not inaptly be called the back bone of Western Canada; for, wherever the river Speed, which runs by Guelph, with its numerous tributary creeks, as they are called, passes on to join the Grand River, which empties itself into the southern Lake Erie, the brooks and rivers a little beyond Guelph take an opposite course to the northern lakes, Simcoe, &c.; and the excellence of this elevated region for persons of scrofulous and consumptive constitutions seems to depend on its pure, dry, tonic, atmosphere, and its entire freedom from marsh miasmata.

That this locality, however, is not recommended for those actually suffering from tubercular disease of the lungs in an advanced stage I need scarcely say. For such, the mild, soft, agreeable atmosphere of our own south-western coasts, the Isle of Wight, Madeira, &c., is doubtless to be preferred. But when we see how widely prevalent these diseases are become among us, and how many, consequently, there are, who, from hereditary or other causes, have acquired a strong predisposition to these fatal maladies, it is an important inquiry how the development thereof may best be counteracted; and, in my opinion, it is not a little satisfactory to know, that in one of our own colonies, among our own fellow-subjects, enjoying the same excellent laws and institutions as ourselves, there is a country possessing also many advantages for emigrants, where these complaints are unknown; except when actually imported. A country, the atmosphere of which is so invigorating as to constitute, for such constitutions, a natural correction.

Beeston, near Nottingham,
September 2d 1843.

Art. VII.—*Some Account of the Epidemic Fever prevailing in Glasgow.* By David Smith, M. D., &c.

For several months past a form of continued fever has prevailed to a very considerable extent in Glasgow, presenting certain symptoms, the true nature of which has given rise to much discussion. I shall devote this paper to little more than a description of the disease as it came under my own notice. This I feel the more called upon to do, as the field of my labours has been in the lowest, filthiest, and most densely populated part of the city, and, of course, the least adapted for satisfactory practice, or correct theorising.

The tenements in which I have visited, are occupied from the cellars to the attics, and almost altogether kept for lodging-houses,—many of them being more fit for pig-styes than dwellings for human beings, and in not a few the donkey and pigs rest at night in the same apartment with the family. The entrance to these abodes is generally through a close, not unfrequently some inches deep with water, or mud, or the fluid part of every kind of filth, carelessly thrown down from unwillingness to go with it to the common receptacle; and in every close there is at least one of these places, situated often immediately under the windows of the dwelling-houses, or, together with byres, stables, &c., forming the ground-floor; while the stench arising therefrom, in summer, pollutes the neighbourhood and, more especially, renders the habitations above almost intolerable. The beds are variously constructed; some being merely a portion of the floor divided by a piece of wood, kept in its place with stones or brick; others have this space filled with shavings, or straw, without a blanket or coverlet; in other cases the beds are formed in tiers over each other, as in the steerage of an emigrant ship; and in a few there may be found a mattress and bed-clothes. Ventilation, even were it possible to be of use, is never attended to; the inmates of these hovels being, to all appearance, perfectly contented to breathe an atmosphere loaded with tobacco smoke, and the emanations arising from total disregard to cleanliness. Need I add to this that the inhabitants with whom I have to deal are of the very lowest ranks in society; a few of them are labourers, but the great majority are hawkers, and beggars, thieves, and prostitutes. At night whole families sleep in one bed, and as there are several beds in each apartment several families are made to occupy it. Thus, there are sometimes from twelve to eighteen persons huddled together in a space not more than as many feet square; and fathers, mothers, brothers, and sisters, dress and undress before each other, and also before strangers. In short, of the moral degradation, grossness, and misery of these people no adequate description can be given; and few, very few indeed, besides the district surgeons, know the actual condition of the pauper population of Glasgow. To practise, then, with satisfaction in such a situation is perfectly out of the question, not only from the want of pure air, cleanliness, diet, &c., so desirable in the treatment of disease, but the

habits and spirit of such patients lead them to an almost total disregard of following out any prescription which interferes with popular prejudice or with what they consider right; at least in my intercourse with the poor I have uniformly found that the more illiterate and sunk in society any party is so much the more does he seem inclined to act in opposition to the wishes of his medical attendant.

As already stated, the fever which has prevailed epidemically for nine months past, has presented several varieties in its character and symptoms; and it appears that, to make the reader best acquainted with these, it is proper to describe, *first*, the most simple form, and, next in order, those affections which accompanied the disease,—the former being essentially the fever, while the latter can only be considered as secondary complications.

The symptoms which have marked the earliest stage of the fever are, lassitude and general languor, followed, after a shorter or longer interval, by headach, pain in the back and limbs, and chills, alternating with flushings of heat. The tongue is dry and slightly covered with a milky-looking fur, the bowels are almost universally inactive, although in a few instances diarrhœa is one of the first symptoms; the urine is high-coloured; there is considerable desire for cold drinks; the appetite for food is impaired; the pulse and respiration are fuller, stronger, and more frequent than natural; the countenance is depressed, and occasionally anxious; and the sleep is disturbed, or entirely gone. As the fever advances these symptoms become aggravated. The skin is hot; the headach and pains in the loins and over the body are severe, causing great restlessness in bed; the tongue is furred and dark in the centre, while towards its edges it is parched and red; the countenance is flushed; the pulse is occasionally as high as 156 in the minute in adults; the bowels, when no diarrhœa is present, require the most active purgatives to excite their action; the urine becomes scanty, and is often voided with difficulty; and the thirst is urgent. At evening the usual exacerbation of continued fever, with remission towards morning, is perceptible, but slight; and delirium, when at all present, is never violent, nor of long duration. The patient continues in this state for some days, when, very frequently after a chill, free perspiration bursts out over the whole body, and in a few hours every marked symptom of the disease disappears; or about the time of a crisis usually taking place the violence of the febrile action begins to abate, and the fever gradually declines, or, as I have thought that I observed in a few instances, passes into a typhoid form. In either case, however, the termination is followed by a state of great exhaustion, felt even while in bed and at rest; and the convalescence is always slow, although the period of attack has not extended beyond a week. The number of cases of this primary fever met with in conducting the treatment of 1000 successive cases, was 205.

Complicated with the above, in a very large proportion of cases, the first secondary affection which deserves attention as having prevailed most frequently, is gastric irritation. This symptom, in

some instances, amounts to little more than nausea, retching, or slight vomiting, with occasional tenderness in the epigastrium; but, at other times, the nausea and vomiting are excessive and constant, continuing for several days when either medicine or drink is swallowed; and pressure over the stomach is intolerable. It cannot be said that either the mild or severe form prevails the one more than the other, much apparently depending on age, previous bodily condition, &c.; but I believe that, in the majority of cases, where there is great depression of the powers of life,—the effect of the latter state, the urine is considerably suppressed, and, in old people particularly, the patient is apt to become lethargic or comatose. I may state that, at first, the egesta are merely the fluids which have been taken to allay the thirst; by and by, as the vomiting continues, bile is mixed with them, and, in some severe cases blood may also be detected; but I have never seen black-vomit occur once in the course of my practice. The number of cases of this affection was 643.

The next most frequent complication, and indeed the peculiarity of this fever, is jaundice. The first patient whom I saw with this symptom was an unmarried female, 22 years of age, who had been affected in the usual manner with fever a few days previous, and, believing her to be labouring under this affection, I had her sent to the fever hospital, where she was refused admittance, as not being a proper patient. But with regard to the jaundice;—it appears in some cases to be very slight, the skin and conjunctiva being merely tinged; but, in many, the yellowness was as deep as may be seen in severe cases of icterus. It generally comes on on the fifth, sixth, or seventh day of the fever; sometimes reaching its fullest point in a few hours, and at other times advancing gradually; sometimes it is unaccompanied with vomiting, but, in a large majority of cases, vomiting with uneasiness or pain in the epigastrium are present, and in no instance have I ever observed it in a child under eight years of age. Its duration varied from one day to a couple of weeks, and I have been led to believe that it does not interfere with the progress of the fever; at all events, the crisis takes place, and there is remission of the febrile symptoms for a few days and relapse, just as if it had not occurred. In this respect the present epidemic differs essentially from the fevers of our country, inasmuch as jaundice has always been a rare complication in them, is seen chiefly in the autumn months, and generally proves fatal; while we have had it prevailing as extensively throughout the spring and summer as in the autumn, and have not considered it as adding to the mortality. And probably it is to this difference more than to any thing else, that some physicians have imagined the prevailing epidemic to be a new form of continued fever, somewhat allied in nature to the yellow fever of tropical climates. The cases accompanied by jaundice amount to 384.

In point of number the cases next to be described are those with petechiæ. These, in general, present little peculiarity. The fever begins and proceeds in the usual manner, sometimes in its simplest form, at other times accompanied with some secondary af-

fection for several days, when spots, small at first and of a bright-red tint, without elevation of the skin, appear on the back of the neck and shoulders, and gradually spread over the body, increasing in size and darkening in colour until they resemble ecchymosed points. In the very young and most aged patients they are almost never wanting; in the former seldom exceeding the breadth of a pin head, while in the latter they are usually as large as a peppercorn, and occasionally nearly as pale as freckles; but patients in the prime of life are by no means exempt from them. They do not seem to add to the danger of the fever; and I am satisfied that they do not appear on a specific day. Some physicians have supposed that they originate in flea-bites, but to this I cannot agree; for they not only want the characteristic mark of a flea-bite, *e. g.* the dot in its centre, but the patient is frequently covered with them in the course of a single night, while on healthy persons sleeping in the same bed not a mark can be seen; and, moreover, on careful examination, flea-bites may occasionally be detected among them. Of course, they are perfectly distinct from the exanthematous eruption of typhus; indeed, with the exception of a few cases of the prevailing fever which were thought to pass into a typhoid form, I have not seen anything of typhus for some months past, and I believe it, as it existed in Glasgow for some years, to be a rare disease here at present. The number of cases having petechiæ was 314.

Diarrhœa and dysentery have very frequently been distressing complications of this fever. In the spring and early portion of the summer months these affections were only occasionally met with, sometimes in the beginning, at other times on the decline of the disease; but for the last four months they have become more common, prolonged, and dangerous. The stools are at first merely more fluid than natural, generally considered by the patient as the effect of purgative medicine; by and by they become dark and of an offensive odour; and at last in severe cases they seem to consist entirely of mucus and blood. In general, there is great pain in the abdomen, and excessive tenderness on pressure not confined to any particular part; but cases have also occurred in which there was no pain, not even uneasiness where the purging was pretty great. The tenesmus is very much complained of, as well as an indescribable feeling of weight and slight irritation about the lower portion of the bowel felt for some time before going to stool, but immediately relieved afterwards. Dysentery accompanies the relapse more frequently than diarrhœa; but both these affections are less apt to occur during the primary attack of the fever than at a later period. They have prevailed to a greater or less extent in 167 cases.

Inflammatory affections of the chest were seen pretty often on the first appearance of the epidemic; but as the summer advanced they became more rare; and of late few cases have occurred. Among children, however, bronchitis has prevailed somewhat extensively throughout the whole epidemic season; and, in a majority of cases, has been more severe in them than in patients beyond the age of puberty. This affection appeared generally with the earliest symptoms, and occurred in 132 cases; while pneumonia and pleuritis

were only seen accompanying the relapse, and were present in three cases each.

Epistaxis, as it usually appears in fever, occurred in 13 cases. It presented no peculiarity worthy of notice.

A form of cynanche, having some resemblance to *cynanche laryngea*, was occasionally a source of much annoyance to the patient. It came on generally about the period of crisis, continued for a few days, and went off again. The fauces appeared dry but not unusually red, and there was no swelling of the parts. This affection occurred in nine cases.

It may not be unworthy of notice, that, in every case brought under my observation, in which pregnancy existed previous to the attack of this fever, abortion has occurred during the progress of the disease. One case, indeed, I did see, which might be said to prove an exception; but in this patient the feverish symptoms were little more than observable, and continued for only two or three days; so that, so far as my experience goes, I am inclined to believe that few, if any pregnant females have suffered from the epidemic without aborting. By a regulation of the town's hospital here the district surgeons are not obliged to attend on cases of miscarriage and delivery among the poor; and from this circumstance I have seen only four or five of the pauper patients in labour; but in these the progress of the fever seemed in no degree changed by the parturient pains. In my private practice, however, I attended one female who took fever in the ninth month of pregnancy, and on the third day of attack became sensible of uterine contraction, at the same time the headach, pain in the loins, thirst, in short, all febrile action, with the exception of the quickened pulse, disappeared, in which condition she continued until labour had terminated, when the disease again presented its usual character, and ran its course little if at all affected by this interruption. In a second case parturition occurred on the third day of the relapse, and here the patient in every respect resembled the preceding; but in another case, which came on on the eighth day of the fever, there was no remission of symptoms, and delivery was followed by the death of both mother and child in about three hours afterwards. The number of females in my district practice who aborted was 16.

The tendency to relapse in this fever has been exceedingly great,—so much so as to have led some physicians to the belief that the disease is essentially of a remittent type, similar to the fevers of hot countries. To confirm this opinion, however, much appears to me to be wanting. The fact that the relapse does not take place in every case, together with the irregularity of the re-establishment of the fever after the remission of the primary attack, may be urged with much propriety against such a view; for although in a large majority of cases relapse occurs, it does so at no definite time, and with no uniform intensity. In some cases the patient has recovered from the first attack so far as to have resumed his work before he is affected a second time, whereas in other cases he has not been free for above a day or two from the first attack, and has neither left his bed nor acted improperly in any way, until the recurrence of the fever; and some-

times the relapse is tedious and severe, while at other times it does not continue forty-eight hours. As is usual also in relapses of continued fever, the secondary affections, excepting those already alluded to, were more uncommon than in the primary attack; and in no case have I seen yellowness of the skin reappear when once it was on the decline. Relapses occurred in 712 cases.

On the disappearance of the febrile symptoms the recovery of the patient was occasionally somewhat retarded by certain sequelæ, which, although not of a dangerous character, were painful or annoying. The most frequent of these was rheumatism; and so universally did this prevail among the poor that not above a-sixth escaped without being subjected less or more to its attacks. The severity of this affection did not seem to depend on the sex, age, or strength of the patient, nor on any form or secondary affection of the fever; all appeared equally predisposed, but all certainly did not suffer alike. In the milder cases some particular joints only were affected to such a degree that motion in them caused pain, while in the more severe cases there was no period of entire ease, and the slightest movement of the body could hardly be borne. In these cases the patients often lay as still in bed as if they had been paralysed, and many of them supposed that they actually suffered from partial palsy; but this condition evidently arose from unwillingness to move the part, in consequence of its being so excessively painful, for if the limb was lifted and left unsupported, it did not fall immediately, and in a few hours, or at most a day or two, the power of motion returned. The rheumatic symptoms continued generally about a week, and always disappeared as the patient became stronger. Two patients had extensive gangrene and sloughing on the nates and over the lower end of the sacrum, from long-continued pressure on these parts, following severe attacks of a complicated form of the fever and of rheumatism, which confined them to bed for several weeks. In a number of cases the ankles became œdematous, and in one female ascites occurred, and proceeded to the fatal event.

Of the communicability of this fever from a sick to a healthy person there does not exist in my mind the least shadow of a doubt; and while I am aware that I may have overlooked some circumstance which might weigh in favour of a different opinion, I have endeavoured impartially to examine the facts which have fallen under my notice every day for some months past, and these have appeared to me satisfactorily to establish the conclusion to which I have come. I have known the disease to pass from one family to another, where the partition dividing them was formed of thin deal board, or where the doors were immediately contiguous, although neither party had visited in each others house; occasionally I have attended patients in succession, whose abodes were each a story higher than the other, the last affected being on the top flat of the tenement; and I have seen, again and again, the disease attack every individual in a family the one after the other, and appear next in another family, some member of which had been in the habit of visiting or attending on the diseased, and spread in this manner throughout a number of

families, the foci becoming more numerous as the epidemic season continued. It is rare for any person to sleep in a house where a patient is sick of fever and escape without being affected. But it were endless to enumerate the facts which go to prove that a more infectious form of fever can hardly exist; for every person, from the infant nursling to the most aged, seems to be less or more obnoxious to its attacks when exposed to its influence. Of course much of this virulence may depend on the class of patients among whom I have practised, and the description which I have already given of my district will show that any disease, if at all infectious, must spread extensively in such a locality; but it is enough for me that my conclusion is legitimately drawn from the evidence thus afforded.

When death occurred, the patients seemed to sink into a state of lethargy or coma, from which they could be easily aroused, and would answer questions put to them with considerable correctness; and in this condition I have seen them remain for a couple of days. Generally, however, when the patient was advanced in years, the change which preceded death, and indicated its approach, was very sudden, more especially in cases accompanied with diarrhœa; and in no instance was there violent delirium, picking at the bed-clothes and such like. The secondary affections were always severe in those cases which did not recover, and, indeed, any variety in the progress and termination of the disease seemed altogether to depend on them. In all, 43 patients died; in 10 cases diarrhœa was present; in 9 jaundice; in 4 vomiting; in 12 diarrhœa, jaundice, petechiæ, &c.; in 2 dysentery; in 5 bronchitis; and in 1 pneumonia. Death took place in 6 cases on the 5th day, and in an equal number on the 10th; in 5 on the 9th; in 4 on the 8th, and the same number on 7th; in 3 on the 27th; in 3 on the 23d; in 2 on the 6th, 11th, and 20th days; and in 1 on the 13th, 16th, 22d, 28th and 30th days. There died 5 under 2 years of age; 3 aged 59, and 3, 28; 2 died in their 23d, 25th, 35th, 51st, 56th, and 60th years; and the remaining 20 were aged as follows:—8, 15, 16, 21, 25, 27, 30, 32, 38, 40, 46, 48, 54, 56, 60, 63, 68, 75, 77, 80.

On the first appearance of the present epidemic amongst us, I embraced the opportunity of testing extensively the effects produced by emetics, diaphoretics, and other evacuants, in cutting short the progress of the disease. In upwards of 150 cases seen on or previous to the third day of attack, this mode of treatment was adopted; and in addition, about 50 patients labouring under the symptoms of threatened relapse, were subjected to the same treatment as those in the incipient stage; but in all I have never seen a satisfactory arrestment of the fever: on the contrary, I have been led to believe, from what has fallen under my own observation, that this disease cannot be cut short at its outset by any means. No doubt cases occasionally occur which seem to prove a different conclusion, but, as has been well observed by Dr Christison, "if we consider how impossible it is in the commencement to distinguish continued fever from ephemera, as well as from some local inflammations which may be cut short, strong reasons will appear for calling

the authenticity of the alleged cases in question." Indeed, so satisfied am I of the inefficacy of any mode of treatment to arrest this fever, and, judging from analogy, any form of continued fever, that in several hundred cases which have been lately under my management, no attempt was made at cutting short the disease, and emetics, active purging, &c., were altogether avoided for this purpose.

The prejudice which prevails so extensively among the class of patients who have almost alone been the sufferers from this fever, viz. that vomiting, sweating, and purging will carry off the disease, enabled me to rely with far more confidence on the results following the exhibition of emetics, diaphoretics, &c., in the incipient stage, than from any medicine prescribed at a later period; in fact, I could place no reliance whatever on three-fourths of what might be told me regarding the effect of any prescription which did not consist entirely with the views of the patients or their friends. On this account I am unable to speak with confidence of what was or might have been useful in the treatment of the disease; and, as this paper has already extended to a much greater length than I could have anticipated, I shall pass over this part of the subject without any further remark.

The excessive debility with which convalescence from this fever has been attended, together with the destitution which prevails among the poor, have caused the recovery of the patient to be more tedious than might have been expected from the duration of the period of sickness, and required the use of stimulants to prevent sinking of the powers of life. In a very large proportion of cases, and more especially in young children and aged people, it was considered necessary that wine should be exhibited pretty early in the disease,—regulated, of course, by the degree of debility,—or, at all events, immediately on the remission of the primary attack; and whatever may be thought of this mode of practice, I am satisfied that the lives of many individuals have been preserved by it. I have heard some medical practitioners say that they considered wine, and such like, unnecessary except in very bad cases, but I have sometimes seen mild cases suddenly become very bad from wine being too long withheld, and during the whole of my experience I have not known a fever patient injured by its being judiciously given. How can it be otherwise? The people are careless of themselves when in health. Their earnings are too often wasted in whisky and tobacco; they want clothing; many are of ruined constitutions from drunkenness and debauchery of every kind, so that they are unable to bear up against severe disease like the present fever, and their recovery depends in no small degree on the use of such means as those to which I have alluded.

Glasgow, 31*st October* 1843.

r. VIII.—*Statistics of Eight of the principal Civil Hospitals in Scotland, prepared from the Managers' Printed Reports, and other authorised Documents.* By J. Thomson, Esq. *With observations by the Editor.* (Continued from Vol. lx., page 362.)

Table C.—Statistics of Disease.

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
scess common,	29	2	6·90				8						28	8	28·6	13						8			86	10	11·6
lumbar,	6	2	33·3	1			1						5			2						4	1	25·0	19	3	15·8
abdominal,													3									1			4		
on knee,													2									1			3		
perinæal,							2						3												5		
mammary,	4						2						2									2			10		
kind not spec.				107						31									42	1	2·38				180	1	·55
menorrhœa & chlor.	21			8									7			5			3			3			47		
masarca and ascites,													20	5	25·0										20	5	25·0
masarca,	14	1	7·14	29	4	13·8	2						9	5	55·5	11	3	27·2	3			1			69	13	18·8
neurism of aorta,	12	8	66·6	1									3	3	100·										16	11	68·7
popliteal	3												3												6		
oplexy cerebral,	9	7	77·7	1	1	100·				6	2	33·3	1									2	2	100·	19	12	63·1
scites,	6	1	16·1	11	3	27·2	1						17	12	70·6	6	1	16·6	6	1	16·6	2	2	100·	49	20	40·8
rticuli Hydrops,				1																					1		
sthma,	3			5	2	40·0	3			3									3						17	2	11·7
rthritis of knee,	14																								14		
naurosis,	7			23						1						1						2			34		

Table C.—Statistics of Diseases.—*(Continued.)*

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
Albugo and Nebula,	4			3																					7		
Anthrax,							3																		3		
Asphyxia,																						1			1		
Angina pectoris,							1																		1		
Aphthous ulceration,																1	1	100·							1	1	100·
Abortion,																1									1		
Bed sores.				1	1	100·							5	2	40·0	1	1	100·							7	4	57·1
Bladder diseased,	3	2	66·6	2									7			3						1			16	2	12·5
Bronchitis,	117	10	8·54	65	6	9·24	11	1	9·09	11	2	18·1	85	3	3·53	36	2	5·55	17			13	1	7·69	355	25	7·04
Bronchocele,	1												1												2		
Bruises & contusions,				78			6			17			85	1	1·17	17						2			205	1	·48
Burns and scalds,	45	14	31·1	28	4	14·2	7	1	14·3	9	3	33·3	62	13	20·9	2	1	50·0	5	2	40·0	8			166	38	22·8
Bubo,							10									2									12		
Calculus vesicæ,	2	1	50·0	20	2	10·0							7			1									30	3	10·0
Carbuncle,				8									5			2									15		
Chorea,				4						2			4			2						1			13		
Calculus complaints,										2															2		
Concussion of brain,				1			1			8			10	1	10·0							2	1	50·0	22	2	9·09
Contract. of tendons,	1												8												9		
Cancer of lip, .				5			1						7									1			14		
breast,													8									2			10		
uterus,				1									3	2	66.6										4	2	50·0
stomach,							1	1	100				2												3	1	33·3

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
ancer of mouth,				1																					1		
tongue,				1									1	1	100							1	1	100	3	2	66.6
nose,													1												1		
ear,				1																					1		
penis,													1												1		
rectum,																						1			1		
aries of hand,				8												2									10		
fingers,													1												1		
bones foot,				6			1			1			2			2						5			17		
wrist,													1												1		
patella,													1												1		
ulna,				1												2									3		
parts not spec.	15	2	13.3																						15	2	13.3
orneitis strumosa,	15						1						5												21		
ynanche tonsillaris,				15			2						9			2						2			30		
ontract. of cicatrices	2																								2		
ut throat, .	3	1	33·3	1	1	100							3			3	1	33.3							10	3	30.0
erebral congestion,	5						2																		7		
ephalalgia, .	20			9			1									6						1			37		
atarrh, .	30			1			1			35						30									97		
holera, .	2															1									3		
olica, .	8			1																					9		
olica pictonum,	2																								2		
ondylomata,				2																					2		

TABLE C.—Statistics of Disease.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
Constipation,	19																								21		
Cystitis,	1																					2			3		
Chron. enlarg. of testis	3																								3		
Cataract,	4			6			1			4						1									16		
Cachexia,																1	1	100							1	1	100
Carcinoma,				1	1	100										10									11	1	9.09
Convulsions,																									2		
Conjunctivitis,	16						3															2			19		
Dog bite,	1			3			1																		5		
Delirium tremens,	36	5	13.9	2									6	3	50.0	1			1						46	8	17.3
Diabetes mellitus,	10	1	10.0	1			3						18	3	16.6										32	4	12.5
Disease of antrum,													1	1	100										1	1	100
brain,	15	2	13.3	2	1	50.0																1			18	3	16.6
lungs,	3						2																		5		
spleen,	1																								1		
testis,	1			3																					4		
ear,	6			8			1																		15		
not specif.	240									2			219			1			98			36			596		
Dysmenorrhœa,	1																		1						2		
Disease of skin,	4			12			5						15			9			29			2			76		
of eye,				39			1						12									2			54		
Distort. feet (varus)	10																								10		
of hand,	1																								1		

Table C.—Statistics of Diseases.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending. 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
Dislocations,	5	2	40·0	8			3									3									19	2	10·5
Dementia,	2						1																		3		
Disordered bowels,							1																		1		
Deafness,				3												1									4		
Diabetes Insipidus,													3			1									4		
Dothinenterite,													4	1	25·0										4	1	25·0
Dysuria,				1																					1		
Diarrhœa,	21	1	4·76	12	1	8·33	6	1	16·6	1			20	2	10·0	1			5	1	20·0	4			70	6	8·57
Dysentery,	10	1	10·0	2	1	50·0	2	1	50·0				18	4	22·2	1						4			37	7	18·9
Dyspepsia,	81			3			14			10	1	10·0	70			9			24			3			214	1	·46
Diphtherite,	4	1	25·0																						4	1	25·0
Emphysema of lungs,	2	1	50·0										1												3	1	33·3
Empyema,				2	1	50·0							6												8	1	12·5
Epilepsia,	21			4									8			1			1						35		
Enlarged tonsils,	2			2																					4		
Enteritis,	3	1	33·3	2			2						4									1			12	1	8·33
Emaciation, debility,	7			1						7	4	57·1													15	4	26·6
Erysipelas,	40	3	7·50	18	1	5·55	2			2			40	4	10·0	14	1	7 14	6			8	1	12·5	130	10	7·69
Ecthyma,	2																								2		
Eczema,	6			8			4						28	1	3·57							1			47	1	2·10
Erythema,	7						4																		11		
Elephantiasis,	1																								1		
Enlarg. glands, neck				2																					2		

TABLE C.—Statistics of Diseases.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
nlarged glands after delivery,	1																								1		
pistaxis, .																						3			3		
schar from sul. acid,							1																		1		
evers,	851	115	13·5	283	16	5·65	113	11	9·73	11	2	18·1	1194	120	10·0	194	5	2·57	40	3	7·50	88	2	2·27	2774	274	9·87
intermittent,				1			1									1						4			7		
istula in ano,	12	1	8·33	3			2						17			5						3			42	1	2·38
perineo,	3			2									4			1									10		
vesico-vaginal,	1			1									4												6		
urethra-vaginal,													2												2		
lachrymalis,	1												1									2			4		
salivaris,	1																								1		
'ractures, .	135	19	14·0							8						2	1	50·0							145	20	13·7
of skull,				1	1	100·							8	7	87·5	1						1			11	8	72·7
humerus,										1			12			2									15		
radius, .				3									11												14		
radius and ulna,													7	3	42·8							2			9	3	33·3
femur, .				8			4			1			18	7	38·8	2	1	50·0							33	8	24·2
neck of femur,				1									3			5						2			11		
tibia, .				5						2			9												16		
fibula, .				4			1						12			1									18		
tibia and fibula,							3						13	3	27·2	8						1			25	3	12·0
clavicle, .				3			2			1			11			2						1			20		

Diseases.	Edinburgh. Year ending 1st Oct. 1842			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842			Dundee. Year ending. 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Mort. p. ct. by each dis.
rac. scapula, (simp.)													4												4		
of lower jaw,				1									1	1	100·	1									3	1	33.3
of spine,													5	2	40·0										5	2	40·0
of ribs,				11									15			2						2	1	50·0	30	1	3·33
of toes,													1												1		
of patella,							2						4												6		
of ulna,				9									4												13		
omp. of ulna and radius,													6			1									7		
of tibia,							2						4			1						6	1	16·6	13	1	7·69
of tib. & fibula,							1						19	8	42·1										20	8	40·0
of femur,				1									18	6	33·3	1						1	1	100·	21	7	33·3
of hand,				2																					2		
of fingers,				1			1						10												12		
of toes,													4												4		
of metatarsal bones,													4			1									5		
racs. of skull and injuries of head,	25	6	24·0																						25	6	24·0
ungoid dis. of testis,	1												2												1		
ungus hæmatodes,																									2		
or. body in œsopha,	1																								1		
uruncul. & anthrax,	8			7			2																		17		

Table C.—Statistics of Diseases.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease	Av. mort. p. ct. each dis.
ost-bite,	3	2	66·6																						3	2	66·6
ssure of anus,	3															2									5		
ercure,							3																		3		
angrene of extrem.,	3	2	66·6	2									5			2	1	50·0				1			13	3	23·0
astritis,	7	1	14·2	6			2						4	1	25·0	3									22	2	9·09
anpowder injur., by				4																					4		
an-shot wounds,	4	1	25·0				2	1	50·0	1			1	1	100·										8	3	37·5
angrene of lungs,	1	1	100·																						1	1	100.
astro-enteritis,	7	3	42·8	1									2			36						2	1	50·0	48	4	8·33
onorrhœa,	25			22			2						4			10									63		
lossitis,	1			1									2												4		
anular dis. of kid.,	48	10	20·8				2	1	50·0										4	1	25·0	4			58	12	20·6
eneral dropsy,	4	2	50·0	1						4	2	50·0													9	4	44·4
anglion of knee,	1															1									2		
rowth of larynx,													1	1	100·										1	1	100·
astrodynia,				55												1						2			58		
æmoptysis,	7	1	14·2	13	3	23·0							4	2	50·0	3			9						29	6	20·6
æmatemesis,	5						1						4			3			2						15		
arelip,	1			2									4			1									8		
eart diseased,	95	35	36·5	25	4	16·0	5	3	60·0	2			36	14	38·8				4			4	1	25·0	171	57	33·3
emorrhoids,	9						7			5			5			1			3			5			32		
emiplegia,	21	3	14·2				3						18	1	5·55										42	4	9·52
ern., (ingu. stran.),	5	2	4·00	5	1	20·0	6			3	1	33·3	1			1						5			23	4	17·0
ydrocele,	24			12			1						18	1	5·55	3						3			61	1	1·63

TABLE C.—Statistics of Diseases.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Mort. p. ct. by each disease.
lrocephalus,	1	1	100·	2	2	100·							3	2	66·6	4	3	75·0							10	8	80·0
pochondriasis,	8			3									18			3									32		
steria, .	27			34			3			3			16			4						15			102		
patitis, .	4	1	25·0	6												1	1	100·				1			12	2	16·6
maturia, .	1						1																		2		
matocele, .	1																								1		
drarthus, .							4																		4		
drothorax,				4	2	50																			4	2	50·
rpes, . .				2			2			13						2						1			20		
pertrophia cordis,																8	4	50·0							8	4	50·0
erus, . .	11			2			1						10	5	50·0	1	1	100·	2	1	50·0	1			28	7	25·0
is, . ,	12			10			5						2									2			31		
lam. of cell. mem.,	4	2	50·0				3															1	1	100·	8	3	37·5
subfascial arm,													1												1		
uterus, .				1																					1		
bursa over patellæ	19			1																					20		
bladder (chron.),	7			2																					9		
lacrymal sac,				3																					3		
testicle, .				12												3						4			19		
extremities,																6						9			15		
nts dis.—shoulder,	2												2												4		
elbow,	4	1	25·0				1						4									1			10	1	10·0
hip,	20	1	5·00										18			9						3			50	1	2·00
knee,	17	2	11·7				5						30			5						4	1	25·0	61	3	4·91

Table C.—Statistics of Diseases—*(Continued.)*

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Mort. p. ct. by each dis.
nts diseased, ankle	2						1						23			1						3			30		
loose cart. knee.,				1	1	100																			1	1	100
hand, wrist, elb.,	9												9			3									21		
toes, .	5												15			3									23		
fingers, .													8												8		
not specified,				82	1	1·22																			82	1	1·22
estinal worms,	1																					1			2		
huria renalis,	1																					1			2		
ontinence of urine,	2			2			1																		5		
nition, .	1																								1		
petigo, .	5			11			3						8												27		
luenza, .							1									8									9		
lammation of ear,																1									1		
of periosteum,																2									2		
s of nose,	2																								2		
icoma & ob. pupil,	3																								3		
pus,	4			4			1						10									1			20		
hen, .	1																								1		
icorrhœa, .	13			3			1			4			4			1									26		
yngitis, .	1			5	2	40·0							5												11	2	18·1
chronic, .	7	2	28·5				1																		8	2	25·0
er, organic disease,	14	4	28·5	1	1	100							17	5	29·4				9	1	11·1	1			42	11	26·1
mbago, .				5									4			1						1			11		

TABLE C.— Statistics of Diseases—*(Continued.)*

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 21st Dec. 1832.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Mort. p. ct. by each dis.
pra and psoriasis,	21			14			2						21			5						2			65		
xations, not speci.,										3															3		
of shoulder,													4												4		
of hip, . .													1												1		
lformation of foot,																1									1		
senteric disease,				3	1	33·3																			3	1	33·3
ningitis, . .													5												5		
lig. dis. of testic.,													1												1		
of lungs, .	1	1	100																						1	1	100·
of bones, .	4	1	25·0				2																		6	1	16·6
mma, scirrhus of,				5																					5		
tritis, . .	1																								1		
norrhagia, .	13			1												1	1	100	1						16	1	6·25
nia, . .	23			2																			1		25		
rbus coxarius,							5															1	1	100	6	1	16·6
rcurialism, .																						1			1		
vus, . .				4																					4		
crosis, of tibia,	17	4	23·5										13	1	7·69	1									31	5	16·1
of ulna, .													1												1		
of femur, .													7												7		
bhralgia, .				1																					1		
rosis, . .				4																					4		
ralgia, . .	12						3			7			7									1			30		

Table C.—Statistics of Diseases—*(Continued.)*

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Mort. p. ct. by each dis.
Nephritis,	5	1	20·0	2												1									8	1	12·5
Onychia,				1												1									2		
Orchitis,	7												13												20		
Otites,				1																					1		
Ophthalmia,	3			24						7						8			8			13			63		
Obstipatio,				4																					4		
Organic dis. of stom.,	11	4	36·3																						11	4	36·3
of uterus,	11	1	90·9																			1			12	1	8·33
of ovaries,	5	1	20·0																						5	1	20·0
Ovarian disease,				2																					2		
Obstinate vomiting,	1																								1		
Paralysis,	26	1	3·84	39	2	5·12	1						16			11	2	18·1	13			8			114	5	4·38
Paronychia,	9			1									2												12		
Paraplegia,	18	2	11·1				1						11	1	9·09										30	3	10·0
Pericarditis,	1			1	1	100·	2						3			1						1	1	100·	9	2	22·2
Periostitis,	24			1			2															6			33		
of hand & forearm,													6												6		
of foot,													1												1		
of leg,													4	1	25·0										4	1	25·0
of femur,													2												2		
of humerus,													2												2		
Phrenitis,	7	3	42·8													2	2	100.							9	5	59·1
Puerperal mania,	3																								3		
Pneumonia,	42	16	38·0	10	3	30·0	10	2	20·0				33	9	27·2	27	4	14·8	2			1	1	100·	125	35	28,0
Pleuritis,	14	4	23·5	10			1						22	2	9·09	9						3	1	33·3	59	7	11·8
chronic,	6																					4			10		

TABLE C.—Statistics of Diseases.—*(Continued.)*

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease	Died by each disease.	Av. mort. p. ct. each dis.
Phthisis,	152	78	51·3	34	7	20·5	6	2	33·3	2	1	50·0	65	24	36·9	10	5	50·0	5	2	40·0	5	5	100	279	124	44·4
Parotitis,	2			1			1																		4		
Peritonitis,	11	4	36·3	1	1	100·	1						2			4						6			25	5	20·0
Paraphimosis,				1																					1		
Prolapsus ani,				1			1			2			1									1			6		
uteri,	1												7									1			9		
Pleurodynia,	18			1						2															21		
Purpura hæmorrhag.	3			2																					5		
Poisoning by opium,	4																								4		
Porrigo,	16												6									1			23		
Psora,	5						1			9						4						1			20		
Pterygium,	1																								1		
Polypus nasi,	6			1			1						1												9		
uteri,													1												1		
Procidentia uteri,							1						1												2		
Pleuropneumonia,													8	1	12·5										8	1	12·5
Phlegmasia dolens,													2	1	50 0										2	1	50·0
Prostate, diseased,				1			3						2			3						1			10		
Pregnancy,				2																					2		
Ptosis,				1												1									2		
Pyrexia,													2												2		
Palate cleft,				1																					1		
Phymosis,				2			3																		5		
Palpebral abscess,							1																		1		
Purpura,																1									1		
Phlebitis,																1									1		

TABLE C.—Statistics of Diseases.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Mort. p. ct. by each dis.
Ranula,				3																					3		
Rubeola,	15			6																		2			23		
Retention of urine,	6			3	1	33·3							3						5	1	20·0				17	2	11·7
Rheumatism,	177			57	2	3·50	13			18			112	2	1·78	40			11			17			445	4	·89
Roseola,	1						1																		2		
Rupia,	3			3									4												10		
Rupt. quadriceps ten.				1																					1		
Scarlatina,	12	3	25·0	16						10	2	20·0	16	1	6·25	7									61	6	9·83
Spinal irritation,	14						3																		17		
Sore throat, not syphil.,	10	2	20·0																						10	2	20·0
Submersion,										4															4		
Stricture of urethra,	19	3	25·7				6	2	33·3	4			7			3						1			40	5	12·5
Scrofulous dis. of testis,	1						2																		3		
Scrofula,	10									8			1			12						2			33		
Syphilis, primary,	23						14						26			31									94		
secondary,	58	1	1·72				2						90			27	1	3·70							177	2	1·13
kind not spec.,	13	1	7·69	143			12			19									10			10			207	1	·48
Sycosis,	1						1																		2		
Sclerotitis,	1			6			2																		9		
Staphyloma,	1			3												1									5		
Spinal curvature,	5															1									6		
Spine, diseased,				8									27	2	7·40				1			1			37	2	5·40
injury of				1	1	100·																			1	1	100.
Sciatica,				4									12			2									18		
Stricture of rectum,													2												2		
Synovitis,				2									10												12		

TABLE C.—Statistics of Diseases.—(*Continued.*)

Diseases.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each disease.	Av. mort. p. ct. each dis.
Sibbens,				8			12						1												21		
Sprains,				7			6									3						7			23		
Surgical cases treated,																			17	1	5·88				17	1	5·88
Scalds,				8												5									13		
Scirr. strict. of colon,							1	1	100·	2															3	1	33·3
Tic douloureux,				2									1												3		
Tinea capitis,										6						2									8		
Tabes mesenterica,	2	2	100.																						2	2	100·
Tubercul. dis. of nose,	1																								1		
Tetanus,	3	3	100·													2	1	50·0							5	4	80·0
Tonsillitis,	10																								10		
Typho-enteritis,	2	1	50·0																						2	1	50·0
Tumours & organic dis. on abdomen	10	2	20·0				2																		12	2	16.6
Tumours, malignant,	28	1	3·57																						28	1	3·57
kind not specified.	18			29						8												4			59		
of neck,													1			1									2		
on nose,													2												2		
on mammia,													4												4		
on vulva,													1												1		
on cheek,													4									2			6		
on back,													2			2									4		
on gum,													1												1		
on thigh,													1												1		
on up. jaw bone,													1			1									2		
of thigh,													3												3		
Ulcers,	122	1	·82	112	1	·89	42						273	6		74						23			646	8	1·24
of the throat,				5																					5		
of the bowels,													2	2	00·										2	2	100

TABLE C.—Statistics of Diseases.—*(Continued.)*

Diseases.	Edinburgh.			Aberdeen.			Dumfries.			Montrose.			Glasgow.			Dundee.			Inverness.			Perth.			Total.		
	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Cases.	Died.	Mort. p. cent.	Treated for each disease.	Died by each dis.	Av. mort. p. ct. by each dis.
Urine extravasated,							1						2	2	100·										3	2	66·6
Urethræ occlusio,				1																					1		
Uteritis,																						1			1		
Unknown,				12																					12		
Varicocele,	4																								4		
Vertigo,	2			5																					7		
Variola,	62	14	22·5	19	1	5·26	6	1	16·6	1			38	5	13·1	5						11	1	9·09	142	22	15·4
Varicose veins,				5									4												9		
Varicella,	1																								1		
Vaginæ occlusio,				1																					1		
Vermes,				2						1															3		
Wounds, lacerated,							1						20	2	10·0	18									39	2	·12
contused,							2						5									12	1	8·33	19	1	5·26
punctured,													2												2		
of scalp,	14												12			6						4			36		
of face,	10																								10		
of spine,	4																								4		
of back,	13																								13		
of chest,	2																								2		
of up. extrem.	13												3									4			20		
of lower do.	55	1	1·88				1						2	1	50·0							1			59	2	3·38
not specified,	3			18			3									9						7			40		
of scrot., genitals, &c.	5												1												6		
Total cases treated,	3770	443		1956	85		508	29		324	20		3612	328		916	45		385	15		486	29		11957	994	
Remain. in hosp. at end of the year,	241			134			45			29			207			34			41			62			793		
No. of cases treated to a termination,	3529	443	12·5	1822	85	4·66	463	29	6·26	295	20	6·77	3405	328	9·63	882	45	5·10	344	15	4·36	424	29	6·84	11164	994	8·90

Observations on Table C.—Statistics of Disease.

The different hospitals are arranged in the order in which they were erected, beginning with the Royal Infirmary of Edinburgh, erected in 1736; Aberdeen in 1739; Dumfries in 1775; Montrose in 1780; Glasgow in 1794; Dundee in 1795; Inverness in 1808; and Perth in 1837.

The period comprehended in this table is only one year, and as the hospitals do not make up their annual returns so that the period should terminate at the same day, it has been necessary to specify the day upon which the year ends in each establishment.

The nomenclature of diseases is exactly that of the respective hospital reports, which is arranged alphabetically.

In the reports of the hospitals of Aberdeen, Dumfries, Montrose, and Dundee, all the diseases are enumerated, whether the treatment had terminated or not. While in Edinburgh, Glasgow, Inverness and Perth, the diseases which had terminated, are only enumerated. Owing to this, it was necessary (for a fair comparison) to include the number of cases not accounted for, which is done under the head of *diseases not specified.*

Table C is read: Anasarca, there were 14 cases of this disease and 1 death in Edinburgh, showing a ratio of mortality of 7.14 per cent. 29 cases and 4 deaths in Aberdeen, the ratio of mortality there being 13.8 per cent. There were 2 cases and no deaths in Dumfries. 9 cases and 5 deaths in Glasgow with 55.5 per cent. of mortality. 11 cases and 3 deaths, with a ratio of mortality of 27.2 per cent in Dundee. 3 cases in Inverness, and 1 case in Perth, and no death. The total number of cases of anasarca being 69, the deaths by that disease 13, and the average ratio of mortality by it 18.8 per cent.

Of the 3529 cases treated to a termination in Edinburgh, 443 died, or 12.5 per cent. Of 1822 patients treated in Aberdeen 85 died, being a mortality of 4.66 per cent. Of 463 cases in Dumfries 29 died, or 6.26 per cent. Of 295 patients in Montrose 20 died, being a ratio of 6.77 per cent. Of 3450 patients treated in the Glasgow Infirmary 328 died, being 9.63 per cent. Out of 882 cases in Dundee 45 died, being 5.10 per cent. Of 344 cases treated in Inverness, 15 died, being 4.36 per cent, and of 424 patients in Perth 29 died, being a ratio of mortality of 6.84 per cent. While all the cases treated to a termination in these 8 hospitals were 11164 and the deaths 994, being an average ratio of mortality of 8.90 per cent.

Table D.—Statistics of Surgical Operations.

Operations.	Edinburgh. Year ending 1st Oct. 1842.			Aberdeen. Year ending 31st Dec. 1842.			Dumfries. Year ending 11th Nov. 1842.			Montrose. Year ending 1st June 1842.			Glasgow. Year ending 31st Dec. 1842.			Dundee. Year ending 1st June 1842.			Inverness. Year ending 31st Dec. 1842.			Perth. Year ending 31st Dec. 1842.			Total.		
	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Deaths.	Av. mortal. per cent.
Amputations } larger	18	13	72.2																2	1	50.0				20	14	70.0
of extrem. } lesser,	20	2	10.0																3						23	2	8.69
Amputation of penis,	1																								1		
at shoulder-joint,													1	1	100.										1	1	100.
of thigh,				2									14	8	57.1	2						2	2	100.	20	10	50.0
arm,				4									1												5		
fore-arm,				2						1			6			1						1			11		
fingers,				6									9			14						1			30		
leg,				4			1			1			17	4	23.5	1									24	4	16.6
toes,				1									4			1						5	1	20.0	11	1	9.09
partial of foot													2												2		
part of hand,																2									2		
thumb,																3									3		
thumb & fing.																						1			1		
Cauterizat. of vagina													2												2		
Cleft palate, oper. for,				1																					1		
Couching, (cataract)				5						2			1			1			1			1			11		
Cicatrice face, div. of																1									1		
Drilling lens,				1																					1		
Disloc. red. should. jt.				1									4			1									6		
hip-joint,													1												1		
thumb,																1									1		
Excision of eye-ball,	1																								1		

TABLE D.—Statistics of Surgical Operations.—(*Continued.*)

Operations.	Edinburgh.			Aberdeen.			Dumfries.			Montrose.			Glasgow.			Dundee.			Inverness.			Perth.			Total.		
	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Deaths	Av. mt. p. cent.
rt of lower jaw,	1																								1		
elbow-joint,	3	1	33.3										1						1						5	1	20.0
rt. of *os calcis*,	2																								2		
ilign. tumours.																											
upper jaw,													1	1	100.	1									2	1	50.0
lip,				5			1						4			3			1			1			15		
cheek,													2												2		
neck,													1			1									2		
breast,	7			4									3			1						2			17		
back,													1												1		
parts not nam.				4																					4		
m. non-malign.																											
head,				1																					1		
cheek,													2												2		
gum,				1									1												2		
breast,													1			1									2		
side,																2									2		
back,													1												1		
tum. of vulva,													1												1		
thigh,													1												1		
back of hand,				1																		1			2		
neck,													1	1	100										1	1	100
temple,																						1			1		
eyebrow,																						1			1		
ulnar nerve,							1																		1		

TABLE D.—Statistics of Surgical Operations.—(*Continued.*)

Operations.	Edinburgh.			Aberdeen.			Dumfries.			Montrose.			Glasgow.			Dundee.			Inverness.			Perth.			Total.		
	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations	Died	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent	Operations.	Deaths.	Av. m. p. cent.
ion of tonsil,				2																					2		
of hæmorrhoids,													1												1		
of other parts,	29																		4						33		
la in ano,													11			5						4			20		
in perinæo				1												1									2		
ures in ano,																2									2		
-lip, .	1			2									3			1									7		
ia strangulated,	4	1	25·0	3	1	33·3				3	1	33·3	1												11	3	27·2
rocele paracent.,				9			1									2			5			3			20		
tonyxis,							1																		1		
otomy, .	3	3	100	19	2	10·5							5			1									28	5	27·8
ngotomy,													1												1		
ture of fem. art.,	4	1	25·0										1												5	1	20·0
inter. saph. vein,																						1			1		
us, .				1																					1		
a. for artifi. pup.,				1																					1		
procur. adhes. } ifice of vagina. }													1												1		
s, .				1																					1		
t. of bladder } perinæum, }													2	1	50·0										2	1	50·0
of urethra in do.													1												1		
unica vagi. testis,													4	1	25·0										4	1	25·0
centesis ascitis,				1	1	100·																3			4	1	25·0
oval of testis,	1			1																					2		

TABLE D.—Statistics of Surgical Operations.—(*Continued.*)

Operations.	Edinburgh.			Aberdeen.			Dumfries.			Montrose.			Glasgow.			Dundee.			Inverness.			Ferth.			Total.		
	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Died.	Mort. p. cent.	Operations.	Deaths	Av. m. p. cent.
inoplastic opera.													1												1		
f columna nasi,																									1		
storation of nose,	1																								1		
of parts of nose,	1																								2		
phyloma, oper. for				2																		1			1		
abismus,													3												3		
t. tendons of feet,													1												1		
of fingers,													1												1		
of leg, (ham-str.)													1												1		
of toe,													2												2		
of musc. of eye-b.													1	1	100·										1	1	100·
(subcut.) of veins													1	1	100·										3	2	66·6
ephine,	2	1	50·0																			1			5	2	40·0
acheotomy,	4	2	50·0																						1		
ichiasis,				1																					1		
rices,				1																							
tal operations during the year,	103	24	23·3	88	4	4·54	5			7	1	14·2	125	19	15·2	49			17	1	5·88	30	3	10·0	424	52	12.2

Observations on Table D—Statistics of Surgical Operations.

The different hospitals are arranged as in Table C., and the day upon which the year terminates is specified in the same way.

The nomenclature of the surgical operations is exactly that of the respective hospital reports, the diseases in which are arranged alphabetically.

The space under the heading of the several hospitals is divided into three columns, and is read thus, of Excision of Elbow Joint, there were 3 operations and 1 death in Edinburgh, with a ratio of mortality of 33.3 per cent. In the Glasgow Infirmary, 1 operation and no death; and in the hospital at Inverness, 1 operation and no death. The total of this operation in all the hospitals being 5, and one death, with an average ratio of mortality of 20 per cent. from that operation.

Of the 103 operations in the Royal Infirmary or Edinburgh, 24 died, being a ratio of mortality of 23.3 per cent. Of 88 operations in Aberdeen, 4 died, being a ratio of mortality of 4.54. There were 5 operations and no death in the Royal Infirmary, Dumfries. Of 7 operations in Montrose, 1 died, being a ratio of mortality of 14.2 per cent. Of 125 operations performed in the Royal Infirmary of Glasgow, 19 died, the ratio of mortality being 15.2 per cent. There were 49 operations in the hospital at Dundee, and no death; 17 surgical operations and 1 death in Inverness, with 5.88 per cent of mortality; and 30 operations and 3 deaths in the County and City Infirmary, Perth. These amount in all to 424 operations, and 52 deaths, giving an average ratio of mortality of 12.2 per cent. from all the surgical operations performed throughout the eight hospitals.

General Observations.

It would be an improvement, and would afford a facility for comparison, were the annual returns of the several hospitals to terminate on the same day, *e. g.* 31st December, and all the accounts and appendices to be made out;—detailing the various items of expenditure, and showing the age and number of patients in hospital for each disease, with the cures, deaths, and period of treatment, &c. all after the same form.

The mortality of an hospital does not depend upon the treatment so much, as on the nature of the cases admitted; and as it appears from the Appendix to the reports regarding the Royal Infirmary of Edinburgh for the year ending 1842, that 379 cases of 31 diseases * terminated in 143 deaths, without one recovery (nearly a ninth part of all the cases treated to a termination,) it

* Diseases treated, and number of deaths without one recovery :—

Cases.	Deaths.	Cases.	Deaths.
3. Asthma,	—	2. Calculus vesicæ.	1
7. Amaurosis,	—	4. Cataract,	—
12. Aneurism of thoracic aorta,	8	1. Cystitis,	—

follows that incurable diseases, or cases which lead naturally to a fatal termination, are admitted to hospital in considerable numbers, and allowed to remain after every hope of recovery had vanished. With the view of ascertaining the accuracy of this inference, and to show the number of admissions, and deaths, with the ratio of mortality per cent. from phthisis, aneurism of the thoracic aorta, granular disease of the kidneys, and organic disease of the heart and stomach; and the proportion they bear to the other diseases that were treated to a termination in the following hospitals during the year ending 1842,—this table is prepared.

Hospitals.	Cases treated to a termin. in each hospit. Table C.	Cases of phthisis, disease of heart, kid. and stom. treat. to a term.	Deaths.	Mort. p. ct. from cases of phthisis, dis. of heart, kid. and stomach.	Prop. in which phthisis, dis. of heart, kidn. and stom. bear to oth. dis. under treat.
Royal Infirmary, Edinburgh,	3529	318	135	42.4	1 to 10
——— Aberdeen,	1822	59	11	18.6	— 30
——— Dumfries,	463	13	6	46.1	— 34
Infirmary, Montrose,	295	4	1	25.0	— 73
Royal infirmary, Glasgow,	3405	101	38	37.6	— 33
——— Dundee,	882	10	5	50.0	— 87
Northern Infirm. Inverness,	344	13	3	23.0	— 25
County and City Inf. Perth,	424	13	6	46.1	— 32

The above table may be thus read. Of 3529 patients treated in the Royal Infirmary of Edinburgh 318, (nearly 1 to 10 of the whole) were cases of phthisis, disease of the heart, kidneys or stomach, and of whom 135 died, being a mortality of 42.4 per cent. by these five orders of disease.

[In this hospital, therefore, there is admitted by far the largest proportion of diseases generally allowed to be incurable, in so far as they consist in very great or destructive alterations in the texture of organs, the integrity of which is essential to the continuance of health and life. The whole of the hospitals, indeed, enumerated in this table may, in respect to its results, be distinguish-

Cases.	Deaths.
1. Disease of spleen,	—
3. bladder and prostate,	2
2. elbow and wrist,	—
10. Diabetes mellitus,	1
2. Dementia,	—
1. Dysmenorrhœa,	—
1. Elephantiasis,	—
1. Fistula salivaris,	—
1. lacrymalis,	—
1. Gangrene of lungs,	1
48. Granular disease of kidneys,	10
1. Hydrocephalus,	—
2. Incontinence of urine	—

Cases.	Deaths.
1. Inanition,	—
1. Lichen,	—
4. Lupus,	—
3. Ophthalmia tarsi,	—
95. Organic disease of heart,	35
5. ovaries,	1
152. Phthisis,	78
1. Staphyloma,	1
5. Spinal curvature,	—
4. Tumours not specified,	—
2. Tabes mesenterica,	2
3. Tetanus,	3

ed into four classes. 1*st*, Those in which the greatest number of incurable cases is admitted, about one-tenth; 2*d*, Those in which a smaller proportion is admitted, between one-twentieth and one-thirtieth; 3*d*, Those in which the proportion of such admissions is less than one-thirtieth; and 4*th*, Those in which the smallest number of incurable cases is admitted, being about one in between seventy and eighty. To the first class belongs Edinburgh. The hospital that comes next to the Edinburgh Infirmary, but at a considerable distance, is the Northern Infirmary of Inverness, in which the proportion of organic diseases to that of other diseases is one to twenty-five. Next follow the Royal Infirmary of Aberdeen, the County and City Infirmary of Perth, the Royal Infirmary of Glasgow, and the Royal Infirmary of Dumfries, in which the proportion varies from one in thirty to one in thirty-four. At an interval still greater we find placed the Infirmary of Montrose and the Royal Infirmary of Dundee, in which the proportion is suddenly reduced to more than one-half of the second class of hospitals.

It is not easy to trace any necessary connection or natural alliance in respect to the results now mentioned between the hospitals and the cities and districts in which they are placed. But, nevertheless, these results, viewed in reference to the several hospitals, suggest some important observations.

Edinburgh with a population of 164,451, including Leith, admits and treats 3529, being 23 per 1000; and the hospital of that city, also, notwithstanding that the population is less numerous than that of Glasgow, admits the largest proportion of cases deemed incurable, and which tend naturally to the fatal termination. Glasgow, on the other hand, the largest and most populous city in Scotland, with a population of 273,147 persons, admits to the benefits of hospital accommodation and treatment only 3405 persons, or 13 per 1000; while, if the proportion to the population were observed, which holds in Edinburgh, there would be admitted to hospital accommodation, at least 5865 persons annually, or 2336 more than in Edinburgh.

The proportion of organic diseases, probably approaching in nature to those admitted into the Edinburgh Institution, is still smaller, being not one-third (101) of those admitted into the Edinburgh Infirmary, (318), and consequently a greatly smaller proportion, if considered in reference to the whole population. It can never be argued that cases of this description are less numerous in Glasgow than in Edinburgh, for it is known that the prevalence of disease of the lungs, heart, kidneys, and alimentary canal is nearly the same in all large and populous places. The only inference, therefore, that remains is that most of the patients of this class proceed to the fatal termination at their own abodes.

In the town which stands next for population, viz. Aberdeen, we find 1822 persons admitted to hospital accommodation, which forms a much higher proportion to the population than in Glasgow, and, indeed, higher than in Edinburgh.

The population of Aberdeen amounted in 1841 to 64,767 persons. Of these 1822 are admitted annually to the benefits of the Royal Infirmary, that is, 1 in every 36 persons, or 30 per 1000. In Edinburgh it is 1 in every 47, or 23 per 1000.

In the admission of cases reputed incurable, the Royal Infirmary at Aberdeen is more liberal than that of Glasgow, but three times less so than the Edinburgh Institution.

In Dundee, the town which stands next in point of population, the proportion of admissions is greatly smaller. The population of that town was in 1841, 63,825 souls; and it appears that of these only 882 were admitted to the hospital in the course of the year; and not more than 10 of these belonged to the head of incurable. This is both a very small proportion of the population to be admitted to hospital relief, being as 14 per 1000, which is the lowest ratio excepting Glasgow; and 1 in 87 for the proportion of cases regarded as incurable organic affections.

Perth comes next in the rate of population. It admits 2.7 per cent, or 27 per 1000 of its population, which is more than either Edinburgh or Montrose do, and greatly above what are admitted in Glasgow and Dundee. Of the whole 424 cases, 13 are believed to belong to the head of incurable, which constitutes a large proportion for an hospital situate in an extensive rural district. It is indeed nearly as high a ratio as Glasgow in this respect.

Dumfries and Montrose follow next, their population being each above 13000. The proportion of admissions to the population is nevertheless very dissimilar, the proportion being 15 per 1000 higher in Dumfries than in Montrose. In Dumfries, indeed, the proportion of persons admitted to the Infirmary is the highest of all the hospitals in Scotland, being 38 per 1000. It appears also that the Dumfries Infirmary is more liberal in the admission of cases reputed incurable than the Montrose Infirmary, the number being three times more in the former than in the latter institution, or 1 in 34 for Dumfries, and only 1 in 73 for Montrose.

The Northern Infirmary at Inverness comes last. It appears here that, among a small population of 11,592, the proportion of persons admitted to the Infirmary is higher than in any other hospital or town excepting Dumfries, being 33 per 1000. In Inverness, also the number of incurable cases admitted is higher than in any other hospital excepting Edinburgh, which, as already stated, is, in this particular, at the head of the whole. In Inverness the proportion is 1 in 25 or approaching to one-half of the admissions in Edinburgh.

The different towns then stand in the following order as to hospital accommodation afforded to the population, and as to the proportion of cases of incurable organic diseases admitted:

Accommodation.		*Organic Diseases.*	
Dumfries.	Edinburgh.	Edinburgh.	Glasgow.
Inverness.	Montrose.	Inverness.	Dumfries.
Aberdeen.	Dundee.	Aberdeen.	Montrose.
Perth.	Glasgow.	Perth.	Dundee.]

In the following table cases of fever, phthisis, organic disease of the heart, kidneys, and stomach, and the deaths by these diseases are deducted from the total number of cases treated, in order to show the ratio of mortality per cent. in the several hospitals, from the other diseases, during the year ending 1842.

TABLE—Showing the ratio of Mortality per cent. among the Patients in the Several Hospitals *after* Cases of Fever, Consumption, and Diseases of the Heart, Kidneys, and Stomach are deducted.

Hospitals.	Total cases and deaths in each Hospital.		Number of Fever cases and deaths.		No. of cases and deaths from Phthisis, diseases of Heart, Kidneys and Stomach.		Total Fever, Phthisis, and diseases of Heart, Kidney, and Stomach.		Remain. diseases after deducting Fever, Phthisis, Heart Kidney, and Stomach.		Ratio of deaths per cent. of cases terminated after deducting Fevers, Phthisis, Heart, Kidneys, and Stomach diseases.
	Cases.	Deaths	Cases.	Deaths	Cases.	Deaths	Cases.	Deaths	Cases.	Deaths	
Royal Infirmary, Edinburgh,	3529	443	851	115	318	135	1169	250	2360	193	8·17
... Aberdeen,	1822	85	283	16	59	11	342	27	1480	58	3·91
... Dumfries,	463	29	113	11	13	6	126	17	337	12	3·56
Infirmary, Montrose, .	295	20	11	2	4	1	15	3	280	17	6·07
Royal Infirmary, Glasgow, .	3405	328	1194	120	101	38	1295	158	2110	170	8·05
... Dundee, .	882	45	194	5	10	5	204	10	678	35	5·16
Northern Infirmary, Inverness,	344	15	40	3	13	3	53	6	291	9	3·09
County & City Infirmary, Perth,	424	29	88	2	13	6	101	8	323	21	6·59

This table is read. Of 3529 patients in the Royal Infirmary, Edinburgh, 851 were fever cases; and 318 were treated for phthisis, diseases of the heart, kidneys, and stomach, making together 1169 cases of these diseases,—which, deducted from 3529 in the first column, leave 2360, the number of patients treated for other diseases. And as the total mortality was 443; of whom 115 died by fever; 135 by consumption, diseases of the

heart, kidneys, and stomach, amounting together to 250; the latter number subtracted from 443, (the total deaths,) shows that 193 deaths occurred among the 2360 remaining patients, showing a ratio of mortality of 8·17 per cent. among them.

[This table furnishes several results deserving attention.

It appears, in the first place, that when the deductions already specified are made, the annual mortality of the infirmaries of Edinburgh and Glasgow, the two most populous cities, is very nearly the same, that of the Infirmary of Edinburgh being 81 per 1000, while that of Glasgow is 80 per 1000.

The mortality of the infirmaries of Montrose and Perth, which come next, in this respect, to Edinburgh and Glasgow, is also nearly equal, the mortality being 60 per 1000 in the Montrose Institution, and nearly 66 per cent. in the Perth county and city Infirmary.

Dundee follows next, being nearly fully 10 per 1000 below Montrose, and 15 per 1000 below Perth Infirmary.

The infirmaries of Aberdeen, Dumfries, and Inverness come next, being respectively 39 per 1000, 35 per 1000, and 30 per 1000.

It is not easy to trace any natural relation or connection between these rates of mortality, and the institutions in which they occur, except in the case of the Infirmaries of the cities of Edinburgh and Glasgow. Here we see a large proportion of mortality taking place in two large and populous cities, in which there is every reason to believe that the sick poor are in the same degree of helplessness and destitution, a prey to the same vicious habits, and often the victims of the same kind of diseases.

After this we recognize no possible connection between the rate of mortality and the nature of the population, their habits, and pursuits. Perth has a small population, many of whom are engaged in trades, labour, and agriculture, or at least out-door work. Montrose has a population still smaller, and several of these must be engaged in occupations connected with the sea, in fishing, &c. Yet the mortality in both is twice higher than in Dundee and Aberdeen, in both of which a large proportion of the working classes are known to be occupied in manufactures.

Again, Aberdeen, with a population of 64,767 admits to hospital accommodation, 30 per 1000. Dundee, with a population of 63,825, admits only 14 per 1000. In both towns a large proportion of the population are engaged in manufactures and sea-faring occupation, and pursuits connected with or dependent on a sea-faring occupation; and, consequently, in both towns the population must be situate as nearly as possible in the same physical and social circumstances. It might be expected that the ratio of mortality, in hospital cases, should be the same in both towns, only much less in Dundee, where so many fewer are admitted. In Aberdeen, however, it is 39 per 1000, and in Dundee it is 51 per 1000, thus making the mortality 12 per 1000 more in Dundee, than in Aberdeen.

The results now given present discordancies so considerable that it is impossible, in their present state, to deduce from them any practical conclusions. They, nevertheless, deserve the attention of all those who devote a portion of their time to the administration of public charities. The discordancies now referred to may probably depend on some circumstances with which we are at present unacquainted. These statistical inquiries, indeed, are new, and must be regarded as the commencement only of a series of investigations, the farther prosecution of which may afford the means of explaining and reconciling the discrepancies now mentioned.]

The manager's printed reports show that a number of patients is discharged from every hospital, by desire, as irregular, improper, and having received no benefit. If such patients could be attended to equally well in workhouses or incurable hospitals, this would at once enlarge the accommodation for curable patients, and lessen the expenditure of medical hospitals.

The following table shows the sum that might be saved to the several hospitals by maintaining the individuals in question, for the same period in separate institutions, or work-houses.

TABLE—Showing the cost of maintaining the same number of individuals, for the same period, in the City Charity Asylum; the City Workhouse; and West Church Workhouse, &c.

Hospitals.	Patients. Not benefited. &c,	Patients. Resid. in hospital. Yrs.	Patients. Resid. in hospital. Mo.	Prop. of total ordi. expen. of each hosp. applicable to pat. not benefited.			Proportion of the total expense for food, clothing, salaries, medicines, medical attendance, repairs, applicable to inmates of: The Edinb. Charity Asy.			The Edinb. Char. Workh.			The W. Chur. Workhouse.			Saving or difference between the cost of persons in hospital, and in: The Edinb. Charity Asyl.			The Edinb. Char. Workh.			The W. Chur Workhouse.		
				L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.
Royal Infirmary, Edin.,	280	22	3	575	6	6	293	18	7	176	2	11	155	7	6	281	7	11	399	3	7	419	19	0
— Aberdeen,	112	6	5	118	9	2	84	15	3	50	15	11	44	17	3	33	13	11	67	13	3	73	11	11
— Dumfries.	38	3	0¼	78	7	9	39	19	1	24	8	2	21	2	6	38	8	8	53	19	7	57	5	3
Infirmary, Montrose,	10		8½	11	9	6	9	13	4	5	9	10	4	16	6	1	16	2	5	19	8	6	13	0
Royal Infir., Glasgow,	205	12	10¾	305	17	0	170	7	2	102	0	9	90	4	0	135	9	10	203	16	3	215	13	0
— Dundee,	23	1	4	33	5	2	17	12	3	10	11	1	9	6	6	15	12	11	22	14	1	23	18	8
Northern Infir., Inver.	51	5	0¼	93	13	3	66	6	6	39	16	0	35	1	4	27	6	9	53	17	3	58	11	11
Count. & City In. Perth,	56	4	9	140	15	3	62	15	0	37	12	1	33	4	6	78	0	3	103	3	2	107	10	9

The number of patients in the foregoing table is taken from Table A, column 8, p. 341, and the residence in hospital from column 11, and these sums are multiplied together and reduced to years and months.

The expense of a patient in the several hospitals is taken from Table B, column headed "average yearly expense of each patient, as per column 18," p. 345.

The annual cost of a patient in the Charity Lunatic Asylum is L.13, 4s. 2½d., and of an inmate of the City Charity-Workhouse, L.7, 18s. 4d., per the "Abstract of Income and Expense of the Edinburgh Charity-Workhouse, to July 1843," pp. 23 and 24.

The cost of an inmate in the West Church Workhouse is L.6, 19s. $10\frac{8}{12}$d., taken from p. 50 of the Fifth Report of the Managers for the Poor of that Parish, and is the highest of a series of years.

The foregoing table is read: The 280 patients discharged from the Royal Infirmary, Edinburgh, "by desire, as irregular, improper, with advice, and having received no benefit," had resided in hospital, as *one* patient, for twenty-two years and three months, at an expense of L.575, 6s. 6d. The same individuals, for the same period, would have cost L.293, 18s. 7d. in the Edinburgh Charity Asylum; L.176, 2s. 11d. in the Edinburgh City Charity-Workhouse; and L.155, 7s. 6d. in the West Church Workhouse; consequently, by maintaining them in the Asylum, in place of the Infirmary, L.281, 17s. 11d. would have been saved; by keeping them in the City Workhouse L.399, 3s. 7d. would have been saved; and by maintaining them in the West Church Workhouse the saving would have been L.419, 19s.

Art. IX.—*Remarks on Gangrene of the Face, and its Treatment.* By Henry Obre, Late Assistant Surgeon to the St. Marylebone Infirmary. (Read before the Royal Medical and Chirurgical Society of London, March 28, 1843.)

The reading of this paper was illustrated by wax models, made during the presence of the disease, and after the cure. In bringing the subject of mortification of the face forward, I do not do so with an idea of describing a disease previously unknown, but with a desire to call attention to a mode of treatment which I have found of great value.

Mortification of the face is a disease to be found in large cities, where children reside in bad and ill-ventilated neighbourhoods, where cleanliness is much neglected, and illness seldom attended to, until it has assumed a state when medical treatment can be but of slight advantage. When such children are attacked with lingering or debilitating disease, their vital powers are soon ex-

hausted; it is amongst such patients this disease makes its appearance. The true gangrene of the face is the sequel of typhus, the acute exanthemata, some skin diseases, and I have seen one or two cases follow hooping-cough. In the state of exhaustion after a severe attack of these diseases, the skin and mucous membrane appear extremely liable to take on morbid action, terminating in gangrene. The extreme disorganization of the external integument is most frequently seen as the sequel of scarlet fever; the integument covering the neck often passes into a state of sphacelus, and may extend so far as to expose the muscular tissue, and frequently dissect the blood-vessels as completely as if done by the knife. When the mucous tissue suffers from gangrene after fever, it does so either in the mouth or vagina of females, and I have more than once seen the nose and ear attacked with gangrene in the last stages of typhus.

When spontaneous gangrene of the face takes place it generally confines itself to one side of the face, beginning with a small circular ulceration either at the commissure of the lips, or the mucous covering of the buccal region, but is most frequently to be found at the junction of this region with the gum. This ulceration, if early discovered, has much the appearance of having been produced by mercury. From the point now specified it may spread and destroy the surrounding textures. As it advances the teeth are loosened, and fall out. The ulceration does not increase so rapidly in circumference as depth. The dead portion which is thrown off, is reduced to a soft pulpy mass, and is generally found hanging from the wound and emitting a gangrenous odour; the external integument, which is of a red colour with a glazed appearance, now begins to swell, and has a hard, indurated feel on all points except immediately over the ulceration, where, it is so soft that the slightest pressure would perforate its walls. The softened integument soon becomes blue, an indication that the ulceration has arrived at the surface, which it perforates. From this time its strides are most rapid; the internal organs of the mouth are now exposed; the ravages of the disease soon arrive at their climax, advancing until it renders its victim a most loathsome and disgusting object, by completely destroying the integument covering the greater part of the face, denuding the bone, and in some cases going so far as not only to destroy the mouth and nose, but even the eye; but fortunately the sufferer generally is exhausted before it arrives at such extremes.

My principal object, however, is to direct attention to the treatment of this disease. To arrest its early progress (its work of destruction being so extremely rapid) little more can be done, than attention to constitutional symptoms, by the administration of tonics, and prevention of diarrhœa. As local remedies I have used astringents of decoction of oak bark or tormentilla,

and the application of muriatic and nitric acids, none of which appear to have the slightest control over its progress. If the patient do not sink from previous disease, it advances rapidly until it destroys the external integument. In this state there is a remedy which has produced the most decided benefit. I allude to the application of the actual cautery. It has been used in this disease by Baron and Isnard, and was named to me by Dr Hennis Green, at whose recommendation I have repeatedly used it with marked benefit. The application of a red-hot iron to the face appears a formidable measure; but it may be done without producing pain. When I have used it the patients did not appear conscious of its application. A flat piece of steel being introduced along the side of the tongue to defend it, the heated iron is to be well applied over the entire gangrenous parts. When any spot has been left untouched, the gangrene, when arrested in other parts, will at this point advance. After the cautery has been used a yeast poultice may be applied. In a day or two the slough is thrown off, when granulation and contraction of the wound soon take place. In exemplification of the benefit of this remedy, I will narrate two cases where it produced decided advantage, and in which it immediately arrested the disease. In one the mortification was the sequela of fever, in the other of one of the exanthemata, which will be sufficient, the other cases being treated similarly.

The subject of the first case was a boy, nine years of age, living in an unhealthy situation, who suffered an attack of typhus, and was treated with bark and wine. When sufficiently recovered to sit up in bed, an ulceration of an ash-colour was perceived on the external and back part of the gum of the upper maxilla. It had increased to such an extent, before being discovered, that the first two molar teeth were loosened, and soon fell out. Nitric acid was applied, the ulceration soon passed to the mucous membrane of the cheek, which was hard, swollen, and of a glazed appearance. In a day or two the ulceration passed through the cheek to the size of a half-crown piece. It presented a gangrenous appearance, and was very offensive. The hands required to be restrained to prevent his destroying a poultice of yeast which was applied. Although in this state, he sat up in bed and ate animal food. The strides of the disease were now alarming, advancing to the commissure of the mouth in front, and passing back to within an inch of the tragus. The parents having consented, the actual cautery was applied to the external diseased parts with little or no uneasiness to the child. For a week its progress was perfectly arrested, when it began to increase under the integuments.

The edges of the sore were irregular and everted, the internal parts of the mouth quite exposed, (from the wound,) with the

superior maxilla as high as the zygoma. Being fearful that the lower eyelid would be destroyed, as the disease was extending in that direction, the cautery was repeated with the same success as previously, the slough soon came away, and granulations superseded; at times the double teeth on that side fell out. From this time the wound gradually improved, contracting by cicatrization, and the boy eventually but slowly, perfectly recovered, as will be seen by the cast which I made two years after his recovery. He is, however, unable to open the mouth to a greater extent than a quarter of an inch, in consequence of adhesion of the cheek to the gum on the diseased side, which inconvenience I am desirous of removing by the knife.

The second case was a girl, aged three years, who had always lived in large towns. Her diet was chiefly vegetable, seldom taking animal food, in consequence of the poverty of the parents. When convalescent from measles (for which she had no medicinal treatment) the mother was surprised to see a black mark on the chin, which soon became ulcerated. The following day it destroyed the surrounding parts. I now visited her for the first time. She was laying on her back, apparently suffering little or no pain; the covering of the lower jaw, anterior to the insertion of the masseter, is quite destroyed, except a narrow communication joining the angles of the mouth; the exposed bone beginning to decay; the integument surrounding the disease is pale, tumid, and hardened; fœtor most offensive; pulse 108; tongue covered with a brown fur; in other respects natural. Wine and quinine were administered internally, and nitric acid applied to the diseased surface, but it did not arrest its progress; the gangrene increasing, destroyed the communication between the angles of the mouth, separated the base of the tongue from the bone, passed down nearly to the *os hyoides*, exposing the submaxillary gland, and all the teeth of the lower jaw fell out, while those of the upper continued perfect; the actual cautery was applied over the diseased parts on the external surface, and chlorine cloths laid over after. On the following day a most decided improvement was to be seen. Where the iron had been applied, the disease had not extended; but on the inside of the mouth, where it could not be used, it continued to spread for two or three days, when the child died exhausted. The appearance of the face after death is tolerably well represented by the wax cast, No. 2, which was taken after death; but it does not at all represent the appearance the poor child had.

These cases will be sufficient for my object. Others I could also narrate, were it necessary, to establish the benefit of the actual cautery in this disease. In the first case a complete cure was obtained; in the second the child died, but the cautery completely arrested mortification at the parts to which it was applied, and

would probably have been attended with the same success as in the first case, if it had been employed under equally favourable circumstances.

I am not aware that the actual cautery has been used in this country in the treatment of *gangræna oris*, although most of our writers on the subject recommend it on the testimony of Baron Isnard and Margolin. It is evidently a powerful agent, and is worthy of trial in that form of disease, which, according to Dr Willis, destroys nineteen out of twenty of those attacked. The horrid spectacle this disease sometimes produces may be seen in the cast No. 3, the result of small-pox, and No. 4, the result of impetigo. Both cases, of course, died; and, indeed, no local treatment was used, as they did not come under my care until too late to derive benefit from any treatment.

Art. X.—*On the alleged Infecundity of Females born Co-Twins with Males; with some Notes on the Average Proportion of Marriages without Issue in General Society.* By James Y. Simpson, M.D., Professor of Midwifery in the University of Edinburgh, President of the Obstetric Society, &c.

"It is (says Dr Burns) a popular opinion, and I do not know any instance to discountenance it, that if twins be of different sexes the female is sterile."—"I have never (he adds) had an opportunity of examining the state of the uterus and its appendages after death."*

Some years ago I took considerable pains to collect a series of data for the purpose of testing the validity of the opinion alluded to by Dr Burns in the preceding paragraph. The results of the inquiry were, in 1839, laid before the Edinburgh Medico-Chirurgical Society in the following form.† I venture to publish the observations now, with a few additions and corrections, under the idea that the subject is not devoid of interest in relation to physiology and legal medicine, and involves one or two correlative questions worthy of some degree of investigation. Besides, I know well the many difficulties connected with a statistical inquiry like the present, however brief and simple it may appear when condensed into its ultimate results; and the publication of the evidence that I have obtained upon the topics in view may probably be fortunate enough to save others from expending time and trouble upon the same research.

* See the last edition (1843) of his well known Principles of Midwifery, p. 236.

† In an article on Hermaphroditism in Dr Todd's Cyclopedia of Anatomy, Part xvi. (1839) p. 736, I have stated some of the results of the earlier part of this inquiry.

ON THE REPRODUCTIVE POWERS OF FEMALES BORN CO-TWINS WITH MALES AMONG OUR DOMESTIC UNIPAROUS ANIMALS, AND IN THE HUMAN SUBJECT.

Mr John Hunter, in an essay read before the Royal Society of London in 1779, and afterwards published both in the Philosophical Transactions for that year, and in his work on the Animal Economy, showed that, when among black-cattle the cow brings forth a male and female at the same birth, the male is a perfect bull calf, but the apparent female is almost always imperfect in its sexual organization. Female cattle of this kind, born co-twins with males, have long been distinguished in this country under the name of free-martins. In external appearance and form of body, they usually resemble the ox and spayed heifer more than either the entire male or entire female of the species. They commonly grow to a larger size than either the bull or the cow, and have horns like those of an ox, and a tone of bellowing similar to his, with the same marked disposition to become fat under the use of nourishing food. In general they do not show any sexual desire for the bull or the bull for them.

The defective sexual conformation of free-martin cattle is attested, not only by the observation of their sterility during life, but also by the anatomical examination of their reproductive organs. Mr Hunter had an opportunity of dissecting several free-martin cows. In all of them the external sexual organs were of the female type—the *vulva* and *os vaginæ* being in general well developed. The vaginal canal, however, was contracted at its upper part, and the internal female organs (the uterus, Fallopian tubes, and ovaries,) were altogether rudimentary and imperfect in their structure. In some there was an apparent superaddition of male organs *(testes* and *vasa deferentia)* probably from a permanence of the Wollfian bodies and ducts of the early embryo ; and in one case the ovaries were replaced by bodies having all the external characters of male testicles.

Mr Hunter's observations have been since corroborated by additional cases and dissections made by Scarpa,* Gurlt,† and Allnatt.‡ I have myself had an opportunity of dissecting the sexual parts of two adult and a third young free martin, killed in the shambles of this city, and have found all of them formed after the anormal and imperfect sexual type pointed out by Mr Hunter.§

* Mem. della Societa Italiana, Tom. ii. p. 846.

† Lehrbuch der Pathologischen Anatomie der Haus-Saugethiere, Bd. ii. s. 188. Tab. xxi. Fig. 2, 3, and 4.

‡ London Medical Gazette, Vol. xviii. p. 528.

§ I have described at length the particular anatomical appearances met with in these cases in Dr Todd's Cyclopedia of Anatomy, Vol. i. p. 702 and 707.

My friend Dr Allen Thomson made some years ago a similar observation upon a free-martin twin fœtal calf.

The butchers in Edinburgh and its neighbourhood, at a number of whom I have made inquiries upon the subject, seem to be perfectly familiar with the fact, that in the free-martin, (whose flesh they usually reckon of a superior quality,) the womb, or calf-bed, as they term it, is in almost all cases apparently wanting; and all our intelligent agriculturists in the Lothians are acquainted with the sterile character of these animals.

Though we are certainly indebted to the sagacity of Mr Hunter for first fully appreciating the value of the physiological sexual anomaly observed in free-martins, and for confirming the fact by accurate anatomical investigation, yet it is but proper to mention that the circumstance itself of the infecundity of the free-martin cow has long, as was indeed pointed out by Mr Hunter himself, been notorious among agriculturists in Great Britain, and is prominently mentioned by Leslie, and some of the older authors on husbandry.

Indeed, the Roman agriculturists seem not to have been unacquainted with the variety of barren female cattle under consideration; or at least their attention appears to have been so often attracted by cases of sterility in the cow, that they found it a matter of convenience to employ, as we do, for their designation and distinction, a specific noun, and named them *Tauræ*. Thus Varro in his work "De Re Rustica," tells us "Quæ sterilis est vacca *taura* appellatur,"* and Columella, in speaking of the sorting (*delectus*) of the flock, directs that "those which have brought forth, and the old cows which have ceased to breed are to be removed, and so also the *tauræ*, which occupies the place of fertile cattle, are to be set aside, or to be trained to the plough, since they are not by their sterility rendered less fit for labour than the common heifer."† There is no direct evidence, however, to show that the Romans were aware of the particular circumstances, in respect of plural births, under which such *tauræ* were produced.

Though the infecundity of free-martin cows be a very general fact, still it is by no means an universal one. Mr Hunter, in his original essay on the subject, mentions that in one instance, in examining a free-martin that died when about a month old, he found all the organs of generation well formed. After stating this case, he adds, "I have heard of other twin cows breeding; but as I cannot call to mind the names of the individuals who communicated the circumstances to me, I have only mentioned one of undoubted authority."

* Libri de Rustica Catonis, Varronis, Columellæ &c. Paris Edit. (Liber ii) p. 82.

† Enixæ et vetustæ quæ gignere desierint summovendæ sunt, et utiquæ *tauræ*, quæ locum foecundarum occupant, ablegandæ, vel aratro domandæ, quoniam laboris et operis non minus quam juvencæ, propter uteri sterilitatem patientes sunt. Ibid. Lib. vi. Cap. xxii. p. 232.

An anonymous author in the Farmers' Magazine for November 1806,* has described such an instance in a free-martin belonging to Mr Buchan of Killingtringham. This cow was well made and a good milker; she produced one calf. The same gentleman (Mr Buchan) had a second free-martin which never bred. Another writer in the same Magazine for November 1807, makes the following statements. "On the 11th of November 1804, a cow of mine brought forth two calves, one a bull, and the other a cow calf; and in spring last the female twin produced a very good male calf; yet a neighbour of mine assures me that a female twin belonging to him would never take the bull, and was sold on that account to the butcher at the age of four or five." Dr Moulson of Halifax mentions, in Loudon's Magazine,† the case of a free-martin cow reared by Joseph Holroyd, Esq., of Withers, near Leeds, which copulated with its own twin bull. "In due time," he adds, "the heifer brought forth a bull calf, and she regularly had calves for six or seven years afterwards."

In the course of making some inquiries in West Lothian after cases of free-martin cows, I have become acquainted with two well authenticated instances in which these animals proved capable of propagating. One of these cases occurred some years ago at Newton, near Queensferry. The second was reared by Mrs Cochran of Stewartsfield, Broxburn, and produced several calves. Such exceptional cases, however, as those to which I have alluded, appear, on the whole, to be comparatively so rare in their occurrence, as not to invalidate the generality of the fact with regard to the sterility of the free-martin twin cow, and render it a question of interesting inquiry whether this law of infecundity in the female of male and female co-twins be confined only to plural conceptions among black-cattle, or extends also to twins among other species of uniparous animals.

In reference to the females of opposite sexed twins among sheep, I have been assured from different quarters that the law of the sexual imperfection and infecundity of the free-martin cow does not hold good with respect to them. Several varieties of sheep, particularly some of those belonging to the white-faced breeds, produce twins with such constancy that we may truly consider this as one of their occasional hereditary characters. These twins are not unfrequently of different sexes, and yet instances of sterility are rarely if ever observed among such flocks.‡

I have not been able to learn how the matter stands with regard

* See Youatt on Cattle, p. 539.

† Magazine of Natural History, Vol. v. p. 765.

‡ The tendency to the production of twins in the human subject is sometimes so marked in particular families as to entitle it to be considered as almost a hereditary peculiarity. I know of one family, in the different branches of which twelve pair of twins have been born within three generations.

to twins among goats, not having access in this district of country to any information or direct observation upon the subject in that animal.

I have hitherto been equally unsuccessful in tracing out any instance of a twin mare or she-ass, born under the circumstance already pointed out, being reared to maturity. The mare, indeed, appears only in extremely rare cases to produce twins, and these twins are almost always endowed with such feeble powers of life as seldom to survive for any length of time after birth.

Sir Everard Home, in a paper "On Animals preternaturally formed at the time of birth," inserted in the Philosophical Transactions for 1799, and in the third volume of his Comparative Anatomy, after assuming that certain sexual organs in the male and female are originally identical or neuter in their character, and are only afterwards changed to the male or female type according to ulterior circumstances, adds the following observations:—"If it is allowed that the sex is impressed upon the ovum at the time of impregnation, it may, in some measure, account for the free-martins occurring when two young are to be impressed with different sexes at one impregnation, which must be a less simple operation, and, therefore, more liable to a partial failure than when two or any greater number of ova are impressed with the same sex."

"It may also account," he remarks in reference to the human subject, "for twins being most commonly of the same sex; and when they are of different sexes, it leads us to inquire whether the female, when grown up, has not, in some instances, less of the true female character than other women, and is not incapable of having children." "In warm countries," Sir Everard adds, "nurses and midwives have a prejudice that such twins seldom breed."*

In reference to this last remark it is not unimportant to observe, that, as I have repeatedly found during the course of my inquiries upon this subject, a similar prejudice in reference to the infecundity of human females born co-twins with males, exists to a considerable extent among the peasantry of the Lothians, and has very probably been derived from the analogy of the free-martin cow. "The mischief," justly observes a late physiological author, "to which the opinion might give rise in causing a girl to be rejected as a wife for a defect, or taken for an excellence, (according as sterility might be regarded,) which she did not possess, is incalculable."†

The truth or falsity of the opinion itself can only be satisfactorily settled by an appeal to a sufficient number of accurately ascertained histories of cases in which women, born co-twins with males, have reached an adult age and become married.

I have collected what may probably be considered as a suffi-

* Comparative Anatomy, Vol. iii. pp. 333–4.

† See foot-note at page 74 of Dr Fletcher's Rudiments of Physiology.

cient number of such cases for forming some just conclusions upon this subject.

Before, however, bringing forwards the results derivable from these collected cases, as bearing upon the question of the fecundity or sterility of human females born under the circumstances in question, I may, in the first place, mention that instances of twins in the human subject, of whom one child is male and the other female, seem not to be at all rare in their occurrence, though the contrary position is generally believed, and as we have seen was assumed by Home, and made by him at one and the same time a deduction from, and an argument in favour of the particular theory which he held, in respect to sexual development. In proof of this statement, I have analyzed the records of all the labours that occurred in the Edinburgh General Lying-in Hospital from 1823 to 1836, both years included, as well as the published returns of all the cases occurring in the Dublin Lying-in Hospital from 1787 to 1793, as given by Dr Clark, and from 1826 to 1833, as given by Dr Collins,* as also those occurring in the London Maternity Charity from 1828 to 1840,† which are the only returns that I am aware of in which the average number of twin labours and the sexes of the different co-twins have been noted. The three following tables have been constructed from these reports. The first of them shows the average number of twin labours as they occurred in these institutions respectively; the second presents the sexes of the different pairs of twins as they occurred in each; and the third illustrates the proportion in which the different sexed co-twins were to the general number of labours.

I. Total number and proportion of twin-labours.

	Total number of Labours.	Number of Twin Labours.	Proportion of Twin Labours.
Edinburgh Hospital, .	2888	46	1 in 63
Dublin Hospital, (Clark,)	10·337	184	1 ... 56
Dublin Hospital, (Collins,)	16·414	240	1 ... 65
London Maternity Charity,	29·489	318	1 ... 93
	59·178	788	1 in 75

II.—Sexes of the different co-twins in the above 788 cases.

	Two males.	Two females.	Male and female.	Tot. number of twins.
Edinburgh Hospital, .	16	17	13	46
Dublin Hospital, (Clark) .	47	66	71	184
Dublin Hospital, (Collins) .	73	67	100	240
London Maternity Charity, .	93	111	114	318
	229	261	298	788

III. Proportion in which the different sexed co-twins occurred to the whole 59.178 cases of labour:

Male and female twins once in every 199 labours.
Two female twins once in every 226 labours.
Two male twins once in every 258 labours.

* Dr Collins's Practical Treatise on Midwifery, 1836, table beginning p. 331.

† Dr Ramsbotham's Principles and Practice of Obstetric Medicine and Surgery, p. 621, foot-note.

The result of these two last tables goes to show, in opposition to the opinion of Sir Everard Home, that twins of opposite sexes are not by any means uncommon. * And this circumstance, of co-twins of opposite sexes occurring so proportionally frequent, may perhaps be adduced as bearing somewhat against the opinion of Mr Girou, that the sex of the offspring is determined by the sex of that parent whose reproductive power or organism (*puissance prolifique*) is at the time of conception either absolutely or relatively in the greatest degree of vigour.

But to return from this digression. The only data hitherto published, (as far, at least, as I am aware,) containing an appeal to actual facts for the determination of the question of the fecundity or infecundity of the human female, when born a co-twin with a male, are to be found in a short paper published by Mr Cribb, in the Medical Repository for 1823,† and in the notice of a single case of this kind brought forward by the late Professor Meckel, in his essay on Hermaphrodites in Reil's Archives.‡

In the paper referred to, Mr Cribb has adduced the histories of seven married women, who were born co-twins with males, of which the following is the result: six had a family; one had no children, though married several years; or one in six was without issue.

The woman mentioned by Meckel was a mother.

I have endeavoured to obtain as accurate and authentic reports as possible of the married history of various females born co-twins with males, and have so far been successful in gaining such information as I could implicitly rely upon in relation to 113 females born under such circumstances.§ Of these 113 female co-twins, 103 had a family; 10 had none; or about one in ten was without issue. Of the ten cases in which there was no family, 1 had been married above five years; 9 from ten to forty years.

The history of the male co-twin in the 103 cases in which the female was productive was as follows; in 53 he was the father of a family; in 24, he died in early life, or unmarried; in 8, he remained unmarried; in 2, he was married but had no issue; and in 14, his history could not be accurately ascertained.

In addition to the above cases of twins of opposite sexes, I have traced the married history of the female in four instances of triplets, in which there were born either two males and one female,

* As far as the data of these tables go, they would seem also to show, that, among twin births as a whole, more female than male children are produced. Out of the 1576 children born in the above 788 twin cases, 756 were male, and 820 female.

† London Med. Repos., Vol. xx. p. 213—16.

‡ Reil's Archives für die Physiologie, Bd. xi. p. 282.

§ For assistance in the collection of these cases, I am much indebted to various professional friends, and particularly to Mr F. Angus of Holytown, Mr Girdwood of Falkirk, Dr Gilchrist of Leith, and Dr Cowan and Mr Carmichael of Edinburgh. Tables, containing the name, address, and other particulars of each case, are in the hands of the Secretary of the Medico-Chirurgical Society.

or two females and one male.* In all of these four cases the female, whose history I ascertained, had a family. In a case of quadruplets, recorded in the Medical Repository for 1827, there were three males and one female. The males were all reared, and the female became herself the mother of triplets.

If we unite together all the various facts I have alluded to, we shall have the married history of 123 females born co-twins with males. The results, so far as they refer to the question we are discussing, may be stated in the following form; of 123 females born co-twins with males, 112 had a family; and 11 had no issue, though married for several years. In other words, the marriages of the females, born under the circumstances we are considering, were *unproductive in the proportion of one in ten.*

It may be at first sight supposed that this result, though it may not bear fully out, yet that it supports rather than otherwise the popular opinion and the statement of Sir E. Home with regard to the infecundity of the female in twins of opposite sexes. Before, however, assenting to such a modification of the view, it is incumbent on us to inquire

WHAT IS THE AVERAGE PROPORTION OF PRODUCTIVE AND UNPRODUCTIVE MARRIAGES IN GENERAL SOCIETY?

On this point I have been able to gain but little precise information from the statistical or physiological works that I have had an opportunity of consulting. I have made personal inquiry on the same matter at several of our most eminent statisticians without being able to obtain any accurate facts bearing on the subject. In the Dictionnaire des Sciences Medicales, Vol. vi. p. 245,† it is stated that Hédin, a Swedish minister, had noticed that in his parish, composed of 800 souls, one barren woman is not met with for ten fertile. It is further stated, that Frank asserted, (from what data is not mentioned,) that it would be found on investigation, that in most communities containing 300 to 400 couples, at least 6 or 7 would be sterile, without anything in their physical condition to explain the fact. It seems to have been from this assertion of Frank's, that Burdach, who is almost the only author who even alludes to the matter, has given the general statement that one marriage only in 50 is unproductive.‡

* In one of these cases of triplets the three, (two males and one female,) all reached adult life. Dr Merriman, (Synopsis of the various kinds of Difficult Parturition, 4th edition,) observes, p. 260, "So many years had elapsed, notwithstanding repeated inquiries, before I could meet with a well-authenticated instance of three children at a birth being all reared, that I began very much to doubt the fact." Besides the above, three other well-authenticated instances have been reported to me of triplets being viable and reared to manhood. Most certainly, however, one or more generally die shortly after birth.

† See also Neue Abhandlungen der Schwedischen Akademie der Wissenschaften, Vol. xi. p. 70.

‡ Dr Allen Thomson's excellent Essay on Generation in Todd's Cyclopedia, Vol. i. p. 478, foot-note.

For the purpose of ascertaining the point by numerical data, I had a census taken of two villages of considerable size, viz. Grangemouth in Stirlingshire, and Bathgate in West Lothian,*—the one consisting principally of a seafaring population, and the other of persons engaged in agriculture and manufacture.

The following form the results in these two places:

Of 210 marriages in Grangemouth, 182 had offspring; 27 had none; or about one marriage in 10 was without issue.

Of the 27 unproductive marriages, all the subjects had lived in wedlock upwards of five years, and in all the female had been married that period before she reached the age of 45.

Again, of 402 marriages in Bathgate, 365 had offspring; 37 had none; or about one marriage in eleven was unproductive. There were at the same time living in the village 122 relicts of marriages, and of these 102 were mothers; 20 were not mothers; or about one in six had no family. In all, of 467 wives and widows, 410 had offspring; 57 had none; or about one marriage in 8 was unproductive. Of these last 57, six had not been five years married, and there were other six above the age of 45 when married. If we subtract these twelve, we have, of 455 marriages, 410 productive; 45 unproductive; or one in 10⅕th without issue.

Returns such as I have just now adduced are exceedingly difficult to obtain, in consequence of no registers being anywhere kept, as far as I know, that could be brought to bear upon the question. If it had been otherwise, I would here, if possible, have gladly appealed to a larger body of statistical facts, in order to arrive at a more certain and determinate average of the proportion of unproductive marriages in the general community. For the purpose, however, of extending this basis of data, I have analyzed with some care and trouble the history of 503 marriages detailed by Sharpe in his work on the British Peerage for 1833.

Among British Peers there were 401 marriages with issue; 102 without issue; or of

503 existing marriages among British Peers in 1833,

74 were without issue after a period of five years. Of those who had not yet lived in the married state for five years 28 were still without family, and in Burke's Peerage for 1842, there still remained among these 28 marriages

7 without issue, making

—

81 as the total number of unproductive marriages among the ori-

* My young friend, Mr Thomas Girdwood of Falkirk, was so good as make the census of Grangemouth for me. For the data relative to Bathgate I am indebted to the kindness of Mr William Dick of that place.

ginal 503; or the proportion of the unproductive to the productive marriages among this number is as nearly as possible, 1 in 6$\frac{2}{7}$.

In the above calculation I have excluded eight unproductive marriages, in which the age of the husband at the date of marriage exceeded 56. These eight, however, ought to be deducted from the original sum of total marriages that were included, or, in other words, the 503 should be reduced to 495, and then the whole result would stand thus; among 495 marriages in the British Peerage, 81 were unproductive, or 1 in 6$\frac{1}{9}$ were without any family.

The total result of the three series of facts that I have brought forward with regard to the average number of unfruitful marriages may be tabulated, then, as follows,—

	Total marriages.	Marriages without issue.	Proportion of unprod. marriages.
In Grangemouth,	202	20	1 in 10$\frac{1}{9}$
In Bathgate,	455	45	1 in 10$\frac{1}{9}$
In British Peerage,	495	81	1 in 6$\frac{1}{9}$
	1252	146	or 1 in 8$\frac{4}{7}$

We thus see that if the marriages of females born co-twins with males are, as we have found them, unproductive in the proportion of one in 10, they do not, in this respect, exceed the degree of unproductiveness of marriages in other portions of the general community. Nor would I be inclined to forego this deduction, even if the average of unproductive marriages in society should be found, on a broader and more extensive basis of data, to be less than the above facts would seem to show. For certainly my own impression is, that probably I have had reported to me, and have entered among my notes and calculations, a greater proportional number of unproductive females among opposite sexed twins than may actually exist. In relation to such a question as the present all minds are too liable to be impressed with, and recollect instances illustrative of the supposed rule and common opinion, whilst the apparent exceptions to it are unattended to or forgotten. In the earlier part of the inquiry I happened to take notes of several cases that had, in this way, been long stored up, by those that reported them to me, as evidence of the infecundity of the female co-twin, and who deemed them so far to afford sufficient proof of the popular opinion. The latter part of the investigation has, in a great measure, if not entirely, escaped this source of fallacy.

Before finally attempting to draw all the conclusions that are deducible from the facts we have collected, let us consider for a moment the question under another point of view, and inquire—

WHAT IS THE AVERAGE PRODUCTIVENESS OF MARRIAGES IN GENERAL, AND DOES THAT OF THE FEMALE IN OPPOSITE SEXED TWINS COME UP TO THE COMMON STANDARD?

Various authors, in treating of statistics and population, have calculated the average degree of fecundity of marriages in different climates and districts, as Malthus,* Macculloch,† Hawkins,‡ Sadler,§ Sussmilch,‖ Quetelet,¶ and others.** Their observations show this average to vary from the number of 3 children to each marriage as a minimum, to $5\frac{1}{2}$ or $5\frac{8}{10}$ as a maximum. In an elaborate investigation into the subject made by Benoiston de Châteauneuf,†† that eminent statistician states as average results upon a large series of observations, the following general conclusions:—

In southern Europe, 457 births result from every 100 marriages, or about $4\frac{1}{2}$ from each; in northern Europe, 430 births result from every 100 marriages, or about $4\frac{5}{10}$ from each.

Mr Farre‡‡ calculates the mean fruitfulness of marriages in England in ordinary periods to be in every

Marriages.	No. of children.	Prop. of children to each mar.
100	420	$4\frac{2}{10}$

In relation to Scotland Benoiston de Châteauneuf states,§§ that he had the patience to go over the tables of population in seventeen out of the twenty-one volumes of Sir John Sinclair's Statistical Account of this kingdom, and found in every

Marriages.	No. of children.	Prop. of children to each mar.
100	430	$4\frac{3}{10}$.

What is the usual degree of fruitfulness in married life of females born co-twins with males? To make as near an approximation as possible to the solution of this question, I have added together the total number of children produced by 94 of those female co-twins, whose history I have collected. We omit the others remaining on the list, merely because we have no notes taken of the exact extent of their families. The total number of children produced by the 94 mothers alluded to, amounts to 409, or the result when stated in relation to the standard of every 100 marriages of them, would be as follows:—In

Marriages.	No. of children.	Prop. of children to each mar.
100	424	$4\frac{3}{10}$

* Essay on the Principle of Population (1803) p. 224.

† Statistics of the British Empire, Vol. ii. p. 413.

‡ Elements of Medical Statistics, p. 221.

§ The Law of Population, Vol. ii. p. 380, &c.

‖ Gottliche Ordnung. Th. iii. s. 64.

¶ Sur l'Homme, ou Essai de Physique Sociale, (1836) Tome i.

** See a collection of evidence on the point in the Report from His Majesty's Commissioners for inquiring into the Poor Laws, (1834.) Appendix F. of Foreign Communications, and table in Preface, p. xcix. &c.

†† Annales des Sciences Naturelles, Tome ix. p. 431. "Notice sur l'Intensité de la Fecundité en Europe au commencement du dix-neuvieme siecle."

‡‡ See Macculloch's British Empire, l. c.

§§ Annales des Sciences Naturelles, Tome ix. p. 447.

But in 15 of the 94 cases, the mother had as yet only one child at the time her case was noted, having either only lived in wedlock for a year or two previously, or the single child being the result of illegitimate intercourse. If we deduct these 15 cases only (though other mothers with a young and increasing family of two or three children might be excepted from the calculation in the same way, and on the same grounds,) we will have then 79 mothers producing 364 children; or, again, to state it in reference to the supposed standard of 100 marriages, we have this result as the degree of fruitfulness of such co-twin females. In every

Marriages.	No. of children.	Prop. of children to each marriage.
100	460	$4\frac{6}{10}$

The whole inquiry detailed in the few preceding pages forms an apt illustration of an old remark, that in medicine it often requires a much greater extent of observation and research to disprove satisfactorily an alleged and accredited fact than was ever expended, either upon the original development or subsequent confirmation of it. In the present instance, the results have turned out to be perfectly contradictory of the opinion which I, in common with others, held regarding the infecundity of the female in double sexed twins, when I commenced looking into the subject; and instead of finding my preconceived ideas confirmed by the investigation, they have, on the other hand, been completely confuted by it. For the data that I have adduced do, so far as they go, evidently prove:

1. That, in the human subject, females born co-twins with males are, when married, as likely to have children as any other females belonging to the general community.

2. That, when they are married and become mothers, they are, in respect to the number of their children, as productive as other females.

3. That the same law of the fecundity of the female in opposite sexed twins seems to hold good among all our uniparous domestic animals, with the *exception* of the cow alone.

Indeed, the strong confirmatory evidence which the preceding inquiry affords of this last exceptional point constitutes one of its most interesting results. For certainly it cannot but be considered as an extraordinary circumstance, that, in the cow, the twin existence *in utero* of a male along with a female should, as a general principle, lead, 1. To so great a degree of malformation as we have described in the sexual organs and in the sexual organs only. 2. That this malformation should be limited entirely to the reproductive organs of the female twin, while those of the male twin are perfectly and fully developed. 3. That this sexual malformation should, apparently as far as we yet know, occur in the case of twins in the cow only, and in this species of uniparous animal alone. The curiosity of the fact becomes heightened and increased when we

recollect that when the cow has twins both of the same sex, as two males or two females, these animals are always both perfectly formed in their sexual organization, and both capable of propagating. The whole series of circumstances, when considered in conjunction with each other, seems to form, in relation to the origin of malformations, one of the strangest and most inexplicable facts to be met with in the study of anormal development.

Art. XI.—*Case of an extremely Vascular Tumour simulating Aneurism, for which the Carotid Artery was tied.* By David Kerr, M. D., Lecturer on Surgery in the University and King's College, Aberdeen.

Although the operation of tying the common carotid artery is now one of ordinary occurrence, there are several circumstances connected with the following case which seem to invest it with more than usual interest. Of these may be mentioned, the period of the duration of the disease, the success of the ligature after the morbid growth had acquired such a size, and appeared to have made such progress in other respects as to render any operation all but hopeless. The case may be shortly stated thus.

On the 25th January 1840, I was requested to visit Mrs Fraser, a spare and delicate-looking woman, in her 67th year. She had on the right side of the neck a large circumscribed tumour, pulsating strongly, and extending nearly from the angle of the jaw to the sternum and clavicle, which supported the swelling below, and had apparently interrupted its progress downwards. The sense of pulsation in the tumour, its distension in every direction, as if caused by a force propagated from the centre towards the circumference, and the increase and diminution of the strength of the pulsation by every thing which increased or diminished the force of the heart's action, were calculated to induce a belief that the disease was aneurism, which, to all appearance, had nearly reached its last stage, causing great difficulty of respiration and deglutition with troublesome cough and sleepless nights. At the lower part of the swelling, directly over the sterno-clavicular articulation, mortification had made considerable progress, and arterial blood was occasionally oozing from the sloughing portion. The gangrene had commenced some months previous by several small dark-coloured spots, which had now run into one slough fully equal in extent to the size of half-a-crown. The sloughing process had also penetrated to nearly an inch in depth. This circumstance, together with the firmness of the tumour, led to the opinion, that it contained

a large quantity of coagula. The tumour had so much the appearance of an aneurism springing from the arch of the aorta, that such was my first impression of its origin and nature, being at that time unacquainted with the history of the case, and the dread of causing a fatal hæmorrhage, deterred me from a careful examination of the disease. Concluding that the patient had but a few days at most to live, I enjoined rest and abstinence, and prescribed such medicines as were calculated to diminish the action of the vascular system, and by means of lint dipt in starch I endeavoured to form an artificial covering to that part of the tumour destroyed by sloughing.

In eight or ten days I was agreeably surprised to find that, under the treatment mentioned, the bleeding altogether ceased, and before the middle of February, the dead parts separated, and in less than a month from my first seeing the case, the sore was greatly contracted and nearly cicatrized. The system of treatment to which the patient was subjected had also the effect of producing a temporary diminution in the size of the tumour, and consequently a slight alleviation of the symptoms arising from pressure on the trachea and œsophagus.

The danger of immediate hæmorrhage being now past, the swelling was examined with greater freedom. The trunk of the carotid could be traced winding round the outer and posterior part of the tumour, displaced backwards and outwards by the tumour, until it was completely external to, and behind the sterno-mastoid muscle, which was carried forward upon its anterior surface, together with the external jugular vein, the branches of which, as well as the superficial veins on the chest, were greatly enlarged, in consequence of the circulation being obstructed by the pressure of the tumour. On pressing the carotid below its bifurcation against the swelling, the pulsation in the latter could be completely stopped, and, on removing the pressure, the pulsation and distension of the tumour immediately returned. Having inquired into the history of the case, I found that, about thirty years previous, a small swelling about the size of a pea was observed near the angle of the jaw after a violent fit of coughing, and that it preserved its original size for eight or ten years. About this period it began to increase in size, in consequence, probably, of the patient's having frequently to make such exertions as were calculated to excite the action of the vascular system, and by slow degrees it acquired its present magnitude. These facts then,—the origin of the swelling near the angle of the jaw, its gradual enlargement and progress from above downwards, its pulsatile character, the cessation of pulsation when pressure was made on the trunk of the carotid below its division, and the sudden return of the pulsation and distension of the tumour when the pressure was removed,

would, under ordinary circumstances, have left little doubt that the case was one of aneurism of the carotid artery, commencing probably about the usual place, or at the origin of one of the branches, and this was the opinion entertained by all who had seen it. The *bruit de soufflet*, too, on applying the stethoscope, seemed distinctly to point out the situation of the opening leading from the artery; it may also be stated that the thrilling sensation so common in aneurism was very strong on the cardiac side of the communication. The consideration of these symptoms led to a perseverance in the treatment recommended, the good effects of which were obvious in the cessation of sloughing and bleeding, the slightly diminished size of the tumour, and healing up of the sore. But, notwithstanding the beneficial effects of abstinence, the patient could not be persuaded to carry it to the necessary extent, and having frequently exceeded the prescribed limits, the pulsation in the tumour became stronger, the swelling began to extend towards the left side, pressing more upon the trachea and œsophagus, increasing the difficulty of respiration and deglutition, and causing sleepless nights from frequent troblesome cough, and hence it was concluded that no permanent advantage could be effected by persevering in the above plan of treatment. The operation of tying the common carotid artery was therefore resolved on and performed on the 30th of April.

The short description already given of the extent and situation of the tumour shows that, to secure the vessel at the usual place below the omo-hyoid muscle, was utterly impracticable, as it was concealed by the tumour, which rested on and partly overhung the sternum and clavicle, to which it seemed to have contracted adhesions. The vessel, however, was accessible at the upper part of its course, as it passed along the outer and posterior surface of the tumour, being in this situation displaced backwards from underneath the sterno-cleido-mastoid, and covered only by the integuments, platysma, and cervical fascia. The operation was performed by pinching up a fold of the integuments in a transverse direction, and transfixing it with the knife, which was made to cut its way outward, the wound being enlarged upon a direction to the requisite extent. The integuments, platysma, and cervical fascia, with their thickened cellular connections, being divided, the *descendens noni* came into view, two of the branches of which appeared much larger than usual, and were divided, as an attempt to draw them to the tracheal side of the wound produced intense suffering. The only difficulty encountered in this part of the operation arose from the hemorrhage that took place and obscured the view, proceeding partly from small arteries, but chiefly from a large transverse branch of the external jugular, which was divided and threw out blood so

profusely as to require a ligature. The wound being cleared of blood, the sheath of the vessel was readily pinched up, and opened. The internal jugular vein was found not in its natural situation, on the outer side of the artery, but almost directly behind it; a circumstance which may be accounted for by the relative position of the vein and artery at the base of the skull, and the constant pressure directed against the vessels by the tumour from within outwards. The ligature being passed from the outside of the vessel, excluding the *par vagum*, was tightened upon the artery, and the pulsation in the tumour immediately ceased.

For six or seven hours after the operation the right side of the face was cold; but in the evening of the day of the operation it had acquired its natural temperature, and for a day or two might have been above it, although this was not ascertained by the thermometer. During the afternoon and first night after the application of the ligature there was a sense of weight or oppression about the chest, which disappeared on the second day. There was also severe pain in the head, which lasted for several days, and deprived the patient of sleep.

On the day after the operation there was a very indistinct pulsation in the tumour, but this gradually died away. It were needless to give a long detail of the future history of this case. The wound gradually united, partly by adhesion and partly by granulation, and the ligature came away on the 26th day, and by this time the tumour had greatly diminished in size. The cough and difficulty of respiration entirely disappeared. About four months after the application of the ligature, that part of the unattached circumference of the tumour, to which a measure could be applied, was found to be in the longitudinal direction, 5 inches, and in the transverse, 4. Before the operation these dimensions were found to be respectively 9 inches and 7.

Nine months after the operation, Mrs F. had an attack of pneumonia, of which she died, and thus I was afforded an opportunity of examining the tumour. On carefully dissecting it out along with the carotid artery, from its origin to its primary division, including a short portion of the external and internal carotids, it appeared that the vessel, at the point where the ligature was applied, had undergone the usual process of obliteration. There was no vestige, however, of a rupture of the artery nor of lamellated coagula, the usual appearances to be found in aneurism. But one large branch from the external carotid was discovered leading into the tumour, and from this branch alone it appeared to have derived its whole supply. The tumour itself seemed to be made up chiefly of cellular tissue and vessels, which were loaded with blood.

This, then, was a case of an extremely vascular tumour; whether it should be termed aneurism by anastomosis or morbid erectile tissue, I shall leave modern pathologists to determine; but it gave

rise to all the characteristic symptoms of aneurism, and was evidently tending to the same fatal result as that caused by aneurism, in the same locality, and only permanently interrupted in its progress by the application of the ligature. There was no circumstance connected with the disease, except its duration, which could have thrown a shade of doubt over its nature; nor am I aware that any other operation whatever could have been undertaken for its relief, with a rational hope of success, supposing its nature to have been clearly ascertained, for the size which the tumour had acquired, the firm adhesions it had contracted to the trachea, œsophagus, and even to the carotid itself, the great extent of wound which must have been inflicted in any attempt at its removal, and the unavoidable hemorrhage which would have taken place from the division of numerous large veins, interposed, in a feeble and aged person, an effectual barrier to any other operative procedure.

Art. XII.—*Hospital Statistics of Stone in the Bladder for a period of five years in the Royal Infirmary of Aberdeen; containing a list of all the cases of stone in the bladder that presented for admission from 20th March* 1838 *to 20th March* 1843, *and treated by* William Keith, M. D., Surgeon, Junior-Surgeon to the Royal Infirmary, and Lecturer on Clinical Surgery in that Institution. (Read before the Aberdeen Medico-Chirurgical Society on the 4th of May 1843.)

Although familiar with lithotrity, and successful in its practice previous to my appointment in March 1838, as one of the Surgeons to the Infirmary, and often urged to publish the result of my experience in that mode of curing stone, yet, as I had had no experience in lithotomy, in place of proclaiming the success of an isolated operation, I contented myself with merely publishing two cases,—the first so treated in Scotland,—in the October Number of the Edinburgh Medical and Surgical Journal for 1833, (Vol. xl. page 480),—feeling convinced that, whatever the amount of an individual's success might be, yet that the testimony of a person practising one branch exclusively could aid the profession very little in rightly estimating the relative value of the different modes by which stone in the bladder is to be cured. The wider field for observation which I have since occupied has at length fully obviated the objection to my evidence, above stated; and having patiently waited until the number of cases has so far accumulated as to afford a fair field for comparison, and sufficient material for safe

induction, I venture to lay the annexed statistics before the profession, as introductory to some practical observations on the various modes proposed for curing this prevalent and painful malady, giving greatest prominence, in the first place, at all events, to lithotomy and lithotrity, these constituting the most efficient in the opinion of the writer.

I would premise that every case that presented to me for admission, whatever the age, or the state of health, or of constitution might be, was admitted, and is here accounted for; and this I deem it necessary to state, because, judging from my experience, I should say, if select cases only were to be operated on, there need be few or no deaths after lithotomy or lithotrity. That the comparison, afterwards to be drawn between lithotomy and lithotrity may be strictly impartial, I have, in the annexed tables, confined myself entirely to my hospital experience, fixed a limit to the period, and shown the mode in which every case that offered within the dates named has been disposed of.

Lithotrity has had this preference, that for it a first choice was made from the gross, and, in a majority of the cases, the most favourable subjects for operation chosen, viz. those in perfect health, having small calculi, and an unirritable bladder and constitution, the remaining cases only being left to lithotomy. This admission the latter operation is fully entitled to the advantage of, as my impression is, that of the sixteen operated on by crushing, fifteen would, to a certainty, have recovered, had they been cut; and the fact that selection is deemed absolutely necessary for lithotrity, would tell against it as an operation, were lithotrity proposed as a substitute for lithotomy, or offered to the world as suitable in all cases of stone. No one at all acquainted with the operation will ever put forward such claims in its behalf; but of this hereafter; meantime enough will be learned from the annexed statistics to prove, that, in its own place, it is safe and sufficient, and is such an operation as the public have a right to demand the choice of in a considerable number of cases, at the hand of every professed operating surgeon.

The Infirmary contains 240 beds. The hospital-staff consists of two physicians and two surgeons. The surgical wards are equally divided between the two latter;—those allotted to me containing a total of 56 beds.

Within the period above specified 2352 patients passed through my wards, of whom 1350 were males, and 1002 were females; among the males there were 42 cases of stone in the bladder, among the females only one; giving an average of one male in every $32\frac{1}{7}$ cases, and only one female in 1000. The average of stone cases given by the sum total of surgical cases being 1 in $54\frac{3}{4}$.

The annexed tables will sufficiently explain themselves. The value of such documents depends so entirely on their faithfulness

and accuracy that I have authenticated the particulars of every case by giving the name and residence of every patient operated on. Many interesting facts have come out in the course of my experience, and are recorded to be communicated in my next paper, in preference to loading the tables with too many columns.

TABLE I.—Containing a statement of all the cases of stone in the bladder, admitted between the 20th March 1838, and the 20th March 1843; how disposed of; and the various averages resulting.

No.	Operation.	Aver. No. of days under treatment. After operat.	Aver. No. of days under treatment. In whole	Av. Age.	Aver. Weight of Stone.	Average of Deaths.	Result. Cured.	Result. Reliev.	Result. Dead.	Inspection.
23	LITHOTOMY,.....	35½	60$\frac{19}{25}$	56⅓	8 dr. 14 gr.	1 in 11½	21	0	2	Peritonitis in one case. In the other, a child, exhaust. after leeching.
16	LITHOTRITY,.....	.....	44⅛	56$\frac{5}{16}$	3 dr. 8 gr.	1 in 15	14	1	1	One died from continued irritation from Stone 29 days after the last sitting. The case reliev. caught Typhus Fever after 1 sitting, and never came under treatment for Stone again.
3	Cases wished Lithotrity, but were unfit for it, and declined Lithotomy.	.....	8	68	Large.	As unwilling 1 in 14⅓.				These are known to have since died, worn out by suffering.
1	Was quite broken down, and unfit for either operation.	.....	14	59	Do.	As unfit, 1 in 43.				Died soon after.
43	Out of a total that presented of Surgical Cases,...2352, 1 in 54¾.					mean mort. 1 in 12⅔.	35	1	3	

TABLE II.—Containing the whole details connected with the Cases subjected to Lithotomy.

Date of Admission.	No.	Name.	Age.	Male.	Female.	Occupation.	Residence.	Date of Operation	First day ur. came by ureth.	Event.	Date of Dismission.	Days after operation.	Days in hospital.	Weight of the stone.	Admeasurement of the stone's diameters. Long.	Short.	Trans.
1838, Nov. 1	1	John Taylor,	60	1	—	Farmer	Ellon	Dec. 7,	10th day,	Cured.	1839, Jan. 17	41	78	2½ drachms	1½ by	½ by	1 inch.
1839, April 13.	2	James Reid,	53	2	—	Gardener	Aberdeen	May 7,	20th	—	June 14,	38	62	1¾ do.	2	½	1
... Sept. 19.	3	James Allanich,	55	3	—	Farmer	Strathdon	Oct. 9,	8th	—	Oct. 26,	17	37	5 do.	2	7/10	1¾
... ... 27.	4	Thomas M'Donald,	74	4	—	Labourer	Aberdeen	... 23,	30th	—	Dec. 5,	43	69	4 do.	1½	¾	1¼
... Oct. 24.	5	Alexander Allan,	74	5	—	Farmer	Culsalmond	Nov. 20,	2d	Dead.	Nov. 23,	3	30	11 do.	2	1	1½*
1840, Nov. 24,	6	Charles Watt,	74	6	—	Shoemaker	Aberdeen	1841, Feb. 6,	15th	Cured.	March 20,	42	116	13½ do.	2	1¼	1 9/10
1841, Jan. 16,	7	Alexander Skene,	57	7	—	Bleacher	Do.	Jan. 30,	10th	—	... 12,	40	55	9 do.	1½	1	1¼
... Mar. 30,	8	William Bethune,	19	8	—	Farmer	Forglen	April 14,	4th	—	May 16,	32	46	6½ do.	1¾	1	1 4/10
... April 14,	9	Duncan M'Kenzie,	65	9	—	Do.	Crathie	May 22,	16th	—	July 4,	43	81	2 do.	1	½	1
... July 14.	10	Peter Davie,	61	10	—	Weaver	Aberdeen	Aug. 7,	9th	—	Oct. 9,	63	87	28 do.	2¾	1 3/10	2 1/10
... Aug. 5,	11	James Smith,	59	11	—	Farmer	Echt	Sept. 25,	3d	—	Nov. 11,	47	98	6 do.	2	1	1¼
1842, Jan. 8,	12	David Scatheway,	12	12	—	School	Aberdeen	Jan. 22,	5th	—	Feb. 28,	37	51	3 do.	1 9/10	1	9/10
... Feb. 8,	13	Alexander Reid,	70	13	—	Gardener	Seaton	Feb. 26,	9th	—	March 29,	31	49	5½ do.	1½	1	1
... ...	14	William Kennedy,	4	14	—	Child	Nigg	March 5.	—	Dead.	... 8.	3	28	9 dr. 1 scr.	1¾	1	1¼†
... Mar. 10,	15	William Profit,	38	15	—	Farmer	Towie	... 26,	3d	Cured.	April 15,	20	36	2 dr. 2 scr.	1½	½	1¼
... April 23,	16	William Christie,	69	16	—	Do.	St Fergus	May 14,	14th	—	July 26,	73	94	20 drachms	2½	1¼	1½
... July 14.	17	James Ironside,	65	17	—	Do.	Fyvie	July 23,	20th	—	Aug. 29,	37	46	9½ do.	2	1	1¼
... Aug. 16,	18	John Cock,	58	18	—	Weaver	Aberdeen	Sept. 10,	14th	—	Oct. 31,	51	76	8 do.	2 9/10	1½	1 8/10
... Oct. 25,	19	William Minty,	56	19	—	Farmer	Fyvie	Nov. 19,	6th	—	Dec. 15,	26	51	12 do.	2	8/10	1½
... ... 29,	20	George Gray,	73	20	—	Do.	New Deer	... 12,	14th	—	... 16,	34	48	8½ do.	2¼	1	1 9/10
... Nov. 15,	21	Angus M'Donald,	62	21	—	Seaman	Aberdeen	... 19,	4th	—	... 9,	20	24	1 do.	9/10	½	8/10
1843, Jan. 25,	22	John Adam,	60	22	—	Farmer	Tough	Feb. 11,	11th	—	March 22,	39	56	10½ do.	2	1	1½
... March 9.	23	Alexander Begg,	78	23	—	Do.	Kemnay	April 22,	3d	—	May 30,	38	82	8 do.	1 7/10	9/10	1 4/10
Total, .	23	Average, .	56½						10th			35½	60⅘	8 dr. 14 gr.	1¾ fully,	1 nearly,	1¼ fully.

* He was quite well until late in the evening of the 22d, when he foolishly rose and took exercise for two hours, unknown to the house-surgeon. In the morning he was found to labour under violent peritonitis, of which he died.

† Six leeches were applied for pain in the hypogastric region, on the evening of the 6th. Mistaking her orders, the night nurse persisted in the use of hot poultices over the bites until the hour of visit, 7 A. M., on the following morning, when he was blanched and almost bloodless. He lived till the evening of the 8th, but no means could recruit the loss.

TABLE III.—Containing the whole details connected with the cases subjected to Lithotrity.

Date of Admission.	No.	Name.	Age.	Male	Fem.	Occupation.	Residence.	Dates of Sittings.	Event.	Date of Dismiss.	No. of sittings.	No. of days und. treat.	Weight of the debris caught.
1838, June 9,	1	W. Tough,	66	1	—	House carpenter	Aberdeen	June 10 & 16, Aug. 1, 24, & 31,	Cured.	Sept. 4,	5	87	7 drachms.
—— July 10,	2	J. Taylor,	50	2	—	Farmer	New Deer	Aug. 1, Sept. 15, & Nov. 10,	Dead.	Dec. 2,	3	145	6 do.*
—— Aug. 14,	3	G. Wilson,	58	3	—	Farmer	New Machar	August 15,	Cured.	Aug. 18,	1	4	1 do.
1839, June 27,	4	A. M'Queen,	68	4	—	Shoemaker	Montrose	Aug. 1, 17, 31, Sept. 15 & 25,	Cured.	Oct. 31,	5	126	5 do.†
—— July 23,	5	Joseph Milne,	69	5	—	Farmer	Fetteresso	July 25, Oct. 24 & 30,	Cured.	Aug. 10 / Nov. 3,	3	28	4 do.‡
—— Oct. 1,	6	Peter Brown,	42	6	—	Farm-servant	Rubislaw	October 2,	Cured.	Oct. 4,	1	4	1 dr. 1 scr.
1840, Feb. 4,	7	Janet Shirrefs,	30	—	1	Widow	Aberdeen	Feb. 8 & 25, March 4,	Cured.	April 4,	3	64	4 drachms.§
—— Mar. 24,	8	John Cock,	46	7	—	Weaver	Aberdeen	March 25, April 11 & 22,	Cured.	April 28,	3	35	5 do.
—— Aug. 10,	9	John Mackie,	67	8	—	Mason	Aberdeen	August 13,	Relievd	Aug. 16,	1	6	1 do.‖
—— Dec. 6,	10	John Leslie,	75	9	—	Boatman	Kintore	Dec. 12, 19, 24, 30, & Feb. 11,	Cured.	Feb. 22,	5	78	3½ do.
—— —— 19,	11	A. Malcolm,	77	10	—	Gardener	Aberdeen	Dec. 26 & 30,	Cured.	Jan. 6,	2	18	4 do.
1842, Feb. 15,	12	William Horne	55	11	—	Quarrier	Newhills	Feb. 19, 26, March 30, May 12, July 9,	Cured.	July 12,	5	147	4 do.¶
—— July 14,	13	J. Gordon,	60	12	—	Farmer	Crathie	July 23, Aug. 12, Oct. 14,	Cured.	Aug. 14 / Oct. 18,	3	36	2½ do.**
—— Nov. 15,	14	James Selbie,	48	13	—	Fireman	Banner Mill	Nov. 17 & 19,	Cured.	Nov. 23,	2	8	1 do.
—— —— 24,	15	William Gray,	40	14	—	Shoemaker	Rayne	Nov. 26 & 28,	Cured.	Dec. 8,	2	14	½ do.
1843, Jan. 5,	16	J. Florence,	51	15	—	Farmer	Chapel of Garioch	January 7,	Cured.	Jan. 9,	1	4	½ do.
Total.	16	Average.	56 8/16	15	1						2 13/16	44 1/16	3 dr. 8¾ grains.

* Lithotrity practised in compliance with his fears of lithotomy. He died from continued irritation from stone twenty-two days after the last sitting,—the best proof of the unsuitableness of the case for lithotrity, is the fact that 2½ ounces of stone in large fragments were removed from his bladder after death.

† The tendency to active lithic formation was only subdued after issues were inserted in the loins—200 calculi were broken and brought away during the time he was in hospital.

‡ He returned in October, a renal calculus having sensibly descended—it was broke, and at the second sitting clean scooped out.

§ She remained after the complete removal of the stone on 4th March, until cured also of a vesico-vaginal fistula, October 4th.

‖ He caught typhus fever, from the convalescents in the airing ground, and died of the fever 40 days after the last sitting—Bladder found quite healthy; three small fragments of stone found in it.

¶ There was endless annoyance in this case from recurring attacks of erysipelas of the head, face, and body,—that complaint being prevalent in the hospital at the time.

** October 13, returned with one small fragment which was at once seized, crushed, and brought away.

TABLE IV. and TABLE V.—Showing the comparative prevalence of stone in the bladder at different ages, with the result in the cases treated, whether by

Lithotomy.					Lithotrity.				
No.	Age.	Cured.	Relieved.	Dead.	No.	Age.	Cured.	Relieved.	Dead.
1	under 5.	...	...	1	0	under 5	...	...	...
	From					From			
0	5 to 10	...	...	...	0	5 to 10	...	...	...
2	10 to 20	2	...	...	0	10 to 20	...	...	...
0	20 to 30	...	...	...	0	20 to 30	...	...	...
1	30 to 40	1	...	...	1	30 to 40	1	...	...
0	40 to 50	...	...	...	4	40 to 50	4	...	...
6	50 to 60	6	...	...	4	50 to 60	3	...	1
7	60 to 70	7	...	...	5	60 to 70	4	1	...
6	70 to 80	5	...	1	2	70 to 80	2	...	...
23	Total,	21	0	2	16	Total,	14	1	1

TABLE VI.—Showing the comparative prevalence of stone in the bladder in the various occupations followed by those operated on.

No.	Occupation.	Cured.	Relieved.	Dead.
19	Farmers,	17	...	2
3	Gardeners,	3	...	...
3	Weavers,	3	...	...
3	Shoemakers,	3	...	...
1	Quarrier,	1	...	...
1	Mason,	...	1	...
1	Labourer,	1	...	..
1	Carpenter,	1	...	...
1	Seaman,	1	...	...
1	Boatman,	1	...	...
1	Fireman,	1	...	...
1	Bleacher,	1	..	..
1	Widow,	1	...	...
1	Schoolboy,	1	..	...
1	Infant,	...	...	1
39	Total,	35	1	3

TABLE VII.—Showing the comparative prevalence of Stone in the Bladder in those localities from whence the cases that were operated on came.

Total cases operated on in 5 years, . . 39
From the city of Aberdeen, . 14 cases
— county of Aberdeen . 22 cases,
as under—From the

Parish of Fyvie,	.	2 cases.	Parish of Kintore,	.	1 case.
— Crathie,	.	2	— Kemnay,	.	1
— New Deer,	.	2	— Echt,	.	1
— Old Machar,		2	— New Machar,		1
— Towie,	.	1	— New Hills,		1
— Strathdon,		1	— Ellon,	.	1
— Tough,	.	1	— St Fergus,		1
— Forglen,	.	1			—
— Culsalmond,		1			22
— Chap. of Garioch,		1			—
— Rayne,	.	1			

From the county of Kincardine, 2 cases.
Parish of Fetteresso, 1 case.
— Nigg, 1 case.

2

And from the town of Montrose, . 1 case. Total, 39

Thus have I in the preceding tables fully and faithfully recorded my hospital experience in this department of surgery. From the recorded experience of some of our best English surgeons, the average mortality among those of all ages operated on is 1 in $7\frac{1}{5}$, and that from the age of fifty upwards the mortality increases to one in five or more; while, on the continent, lithotomy to those beyond the age of fifty proves still more disastrous. Dupuytren, in giving a table to prove the success of his new or bilateral operation, boasts of an average mortality at all ages of 1 in $4\frac{1}{4}$, and admits that of six operated on above fifty years of age, five died. He affirms elsewhere that throughout France one dies out of every three operated on beyond fifty years of age, and the assertion is corroborated by Lisfranc, Velpeau, and several other writers. Well might that eminent surgeon, Dupuytren, say: "There is still great room left to desire a method of performing lithotomy less murderous than any yet in use." Considerable interest must, therefore, attach to a mode of operating and plan of treatment that has led to such results as the above tables show.

In lithotomy it will be seen that, of nineteen cases operated on, aged from fifty up to seventy-eight, only one died.

The principles that have guided me throughout in this operation were arranged and fixed by me before I cut a single patient. My instruments I have modified, perhaps improved, but the principles remain unchanged; receiving an additional proof of their soundness from every succeeding case that passes through my hands. These I will, in my next paper, communicate and explain, and then allow the profession to judge whether a closer adherence to sound and fixed rules in operating would not result in far more successful practice.

As to lithotrity I have, for upwards of ten years, been operating in every suitable case that presented. No accident of any kind has ever occurred in my practice, yet I feel that the operation requires to be much simplified before it can be safely adopted by the whole profession.

In this direction I trust I have made some progress, by dispensing with many of the instruments, by doing away with the necessity for injecting the bladder, and by depriving the operation of all its alarming accompaniments, much to the relief of both surgeon and patient,—all which will form subject matter for a paper to follow that on lithotomy.

257, *Union Street,*
Aberdeen, *6th October* 1843.

PART II.

CRITICAL ANALYSIS.

ART. I.—*Practical Remarks on Gout, Rheumatic Fever, and Chronic Rheumatism of the Joints; being the substance of the Croonian Lectures for the present year, delivered at the College of Physicians.* By ROBERT BENTLEY TODD, M. D., F. R. S., &c. London, 1843. Post 8vo. Pp. 216.

WHOEVER takes a comprehensive and candid view of the history of medical theory and practice, and the revolutions which they have undergone, will have little difficulty in admitting that the humoral pathology was subverted and discarded with too much precipitancy and too little regard to its real merits. Of that theory it was the misfortune, as it has been of many others, that it explained too much, and was extensively and indiscriminately applied, when it ought to have been restricted and confined to certain departments only; and every one knows that a theory so employed cannot be well or justly applied in all cases. An evil of a more peculiar character was, that it was not, at the time at which it was so generally maintained by physicians, in that state of perfection and accuracy which alone can render it useful or deserving of confidence. When it was in its most palmy state, chemistry and chemical knowledge, on which it depended, was not only in a state of infancy, but it was encumbered and obscured by many absurd hypotheses, various superstitious fancies, and numerous wild speculations, as well as false or erroneous facts. The result was, that, when men of sense and observation saw what a deformed and chimerical monster the parent was, they inferred that the offspring was not less unnatural and more hideous; and many assuredly either altogether discarded theory, or adopted those doctrines which were at once more generally applicable, and presented fewer fanciful and unfounded notions.

The system of Boerhaave, which was distinguished for the judicious spirit of eclecticism by which its author was guided, did as much as was practicable for the humoral pathology. It cleared that theory of many of its errors and impurities; it fixed with ability the limits of application; and it brought to its aid the effective assistance of physical science generally, and physiological

principles in particular. But when Cullen showed the more extensive and more accurate application of the theory of living forces, as it might be termed, to explain the phenomena of morbid action, and the operation of remedial agents; when, by happy generalization, he taught physicians to look at the human body as neither a machine nor a chemical laboratory only, but a combination of living organs and textures, endowed with irritability and sensibility, that tendency to go to extremes which seems inherent in the human mind, made the whole system of physical and chemical speculation present an appearance so heterogeneous and so frivolous, that it fell at once to the ground, without any effort being made to sustain it or break the force of its descent.

It is no doubt true that one circumstance, which contributed to this result, and as much as any other cause made the humoral pathology be little regarded, was the fact that the chemistry of animal bodies was in a state of great rudeness and error. The science in general was in its infancy; and the difficult and complicated branch of animal chemistry was almost unknown. Since that period great changes have taken place; and much progress has been made in acquiring a more accurate knowledge of the chemical constitution of animal bodies. Not only do we now possess much more accurate knowledge of the chemical principles of all the solid textures of the animal body, as bone, muscle, skin, mucous membrane, brain, tendon, and cartilage, but all the animal fluids, as blood and its component parts, and the several secreted fluids, have been repeatedly analyzed, and, if not thoroughly understood, are at least understood greatly better than they were eighty or even forty years ago.

In proportion as this branch of knowledge has been acquiring accuracy and precision, pathologists have been gradually arriving at the conclusion, that the humoral pathology was discarded in a manner too summary, and that, though it was unable to accomplish all that was once expected, it is yet capable of being applied to some useful purposes. Observation and experience equally concur in showing, that, though the variable conditions of the living solid, as it is termed, or the organic textures, are the great subjects to be studied in understanding and explaining the phenomena of disease and the operations of remedies, yet often the fluids of the animal body must be regarded as having considerable influence in producing the phenomena of various distempers to which the human frame is liable.

Let it further be allowed, that all exclusive views either of the phenomena of healthy or of morbid action are injudicious, in being always partial, and often untrue and inapplicable. To maintain the sovereign and exclusive influence of the solids and their properties and actions in the production of disease, however plausi-

ble, cannot be in all cases just, and it is certainly not philosophical. To maintain the exclusive influence of the fluids in the formation of morbid phenomena would be not less unjust, because it is not always confirmed by fact; and consequently that doctrine is equally liable to the charge of being unphilosophical. But to say that, in certain diseases, the solids may be disordered, and in others the fluids may be altered, and in a third class, both orders of agents may be disordered, is much more likely to be consonant to the order of nature, and to the mode in which she operates in bringing about various results.

There is certainly much more reason in the present day for the qualified admission of a rectified system of humoral pathology, than there was at the time at which that doctrine was fashionable. The labours of Berzelius, Bostock, Prout, Dumas, Lecanu, Simon, Denys, and Andrál and Gaváret have rendered the knowledge of the different animal fluids greatly more accurate than it ever has heretofore been. These labours have not perhaps demonstrated the fact for which the humoral pathologists contended, that the origin of diseases is seated in the fluids; but they have shown that the fluids are disordered in many distempers, and that an important part of treatment consists in attempting to restore them to their healthy state. The excellent work of Dr Prout especially, on stomach and urinary diseases, may be regarded as containing a large amount of instructive information on these points.

The present treatise may be shortly designated as an attempt to describe and explain the morbid state of the blood in gout, rheumatic fever, and chronic rheumatism, to show the influence of this morbid state of the blood in producing the phenomena of these diseases, and to improve the treatment by taking into consideration this piece of pathological theory.

Dr Todd begins the first section of his lecture by recommending the study of the natural history of diseases, that is to say, the study of the phenomena, causes, and effects of diseases according to the ancient Hippocratic method, uncontrolled and unmodified by the influence and operation of remedies. In this manner, alone he argues, should we observe whether any given disease tends spontaneously to a fatal result or to recovery; and what would be its average ordinary duration when not modified by the influence of art. Another advantage of this method would be, he adds, to show the state of the various functions in such morbid conditions, and to enable us thereby to estimate the extent to which they are modified in disease and by its presence; and a third is, that thus we would ascertain the essential and pathognomonic symptoms of different disorders.

These advantages we do not deny; but we think they are accompanied with certain disadvantages, the inconvenience, if not

the evil of which ought to make them be most carefully considered, before the expectant method is generally adopted. In the first place, it must be perhaps regarded as an established fact that, of many diseases of daily occurrence, if we studied them in this manner, the termination would be either in long-continued bad health or in death. Is the expectant method not very commonly pursued in France to the detriment of the patient and to the prolongation of his disease? In the second place, if this method is to be adopted, and if diseases are to be left to nature, as it is called, what is the use of physicians; what is the advantage of studying pathology and morbid anatomy; and wherein consists the use of remedies at all? On these questions, which spring naturally out of the proposal of Dr Todd, that gentleman has not afforded us any information. He merely tells us that observations made in this way must throw great light on the pathology and diagnosis of disease; and that modern improvements are entirely due to observations made in this spirit.

To this it may be answered, that, without giving up entirely the use of remedies, observation will always throw light on the pathology and diagnosis of disease, and it is even instructive, we think, to observe the influence and operation of remedies.

We must further maintain, that we do not think it at all proved that in many diseases the employment of remedies prevents the observation of the natural course of diseases, or that they disguise or modify disease so much as is imagined. It is some time before any remedy, however powerful, operates; and in its operation it is always possible to trace the morbid action, though in a modified form. All that remedies do, in many instances, is to favour the operation of those powers or properties in the textures by which they tend to get rid of disease, or bring it to a favourable termination.

Let not, however, Dr Todd despair of having ample opportunities of studying the natural history of diseases. So far as our observation has gone, we must say, that daily experience affords numerous instances in which diseases are allowed to run their course, not only unchecked, but wholly unmodified by remedial measures; nor do we think that Dr Todd is likely soon to be quite deprived of the advantage which he so strongly commends. Whether from patients not applying for assistance early, or from the cases being neglected, or from whatever cause, it is most certain that several acute diseases, and many chronic ones are daily observed to run the greater part of their course, sometimes the whole of it, without any remedial measure being used at all, or at most without any one being used that could have the slightest influence on the course and effects of the disease. This statement will, we doubt not, be confirmed by the experience of

every practical physician. Thus cases of pericarditis, of pleurisy, and even pneumonia, are observed to pass through all their stages without anything being done for them. Cases of disease of the bones, especially those of the spine, also pass over all their stages; and even disease of the spinal chord itself is often allowed to advance to an immedicable stage without the use of any effective remedies.

In illustration of the justice of his views, Dr Todd appeals to the history of typhous fever;—we think not very happily. For though his position, that the history of this fever is now perfectly well understood, is well founded, yet it can by no means be said that typhous fever is a disease, which may be treated on the expectant method. Neither can it be said that the knowledge which we possess of this distemper has been obtained solely, or even chiefly in this way; for of few diseases can it be said, in this country at least, that its treatment has been so much the subject of trial, speculation, and discussion. This is well known to those that know any thing of the history of the revolutions of medical theory and practice, as to typhous fever. Then is it not matter of observation that the terminations of this disease depend very much indeed on the treatment during the first septenary period?

We are happy to say, that, while we cannot entirely approve of the expectant method in the treatment of the exanthemata, and we agree with him in thinking that no one would attempt to cut short an attack of small-pox or measles, yet we maintain that every good physician would think that it is his duty, to prevent these diseases from doing mischief to the lungs, which in certain epidemics they are very liable to do. As to syphilis, every one must allow that incalculable evil has been done by attempting to cure that disease by the exhibition of mercury, and that it has not only prevented physicians from studying and understanding the proper symptoms and course of that disease, but it has caused a new train of disorders, partly by saturating the system with a metallic poison, partly by causing a conflict, as it were, in the system between an animal poison and a metallic poison.

These reflections, the author tells us, are principally suggested by the discordance that prevails in the opinions and practice of physicians, in reference to gout and rheumatic fever. This discordance, he further thinks, cannot be imputed to absolute ignorance of the natural history of these two diseases, but to imperfect analysis of their natural history, "so that we still stand in need of a careful induction from the facts with which the observations of practical physicians have supplied us, in connection with the improved state of our knowledge of the phenomena of nutrition in its normal state."

The object of the author in the present lectures is to supply

this defect, and to offer on the mode of practice in these diseases some comments which have been suggested by his own experience.

In the performance of this duty, he informs his reader at the first, that it is the main object of his argument to prove that rheumatic fever and gout are diseases of the blood. The phenomena of these diseases he believes to be entirely due to the presence of a morbid element in the blood, generated within it under the influence of peculiar causes.

In defining diseases of the blood, Dr Todd separates two orders of maladies from the category. The first consists of those which, originating in some local taint of nutrition, are disseminated by the blood to other distant parts of the economy, as, for example, cancer, fungoid disease, &c. The second consists of those disorders which appear to arise from the deficiency of some element, which forms a necessary constituent of the blood, such as purpura, scurvy, and certain states of body characterized by an anæmic condition.

Dr Todd, on the contrary, wishes to confine the character of true blood-diseases, as he terms them, to those in which a morbid matter is generated by an abnormal chemical action in the blood itself. The morbid matter, he thinks, may be formed primarily in the blood in consequence of some check to one or more of the ordinary excretions, or from the supply of nutrient material to the blood being too great for the rate at which excretion is carried on; or it may have been introduced into the blood as a poison, which speedily deranges the normal changes that are continually going on within it. In the latter manner all contagious diseases are propagated, the matter of contagion having been introduced into the blood, and to the same head he refers malaria and its effects. To either or both of the former causes specified, Dr Todd thinks that rheumatism and gout may be ascribed.

In proof of the justice of the hypothesis now mentioned, he argues that all blood diseases, whatever their primitive cause may be, present certain characters in common. All present more or less febrile disturbance, at first preceded by a state of depression and rigor;—accompanied or followed by pains in the limbs, or in the joints, sometimes with swelling of the latter, and inability to move them freely, in consequence of effusions within them. The functions of the skin, the liver, and the kidneys, are disordered; and the urine deposits a peculiar sediment on cooling. As soon as the morbid matter has been eliminated from the system, these symptoms subside, and the organs affected recover their healthy state.

Dr Todd then refers to the phenomena of the exanthemata, of secondary syphilis, of gonorrhœa, and of the poison of acute glanders, in confirmation of the truth of his views on this point, and

he quotes from the work of Dr Williams an example of the latter disease in the human subject, in which its external effects were, as usual, abscesses and pustules in various parts of the body. In the same manner he refers to examples of infection of the blood with purulent matter, as happens after wounds, large operations on the extremities, or injuries of veins, and the introduction of dead animal matter into the body, all of which he considers as examples of blood diseases. Poisoning by lead is also considered in the same point of view, and the author relates a good example of this, in which it caused gangrenous inflammation of the lungs and lobular pneumonia of the organ, and in which dissection and chemical analysis showed that lead existed both in the lungs and in the brain. He concludes this section of his work by referring to the state of the blood in diabetes, and in granular disease of the kidney, to show the influence of morbid principles in the blood, in giving rise to various phenomena of both of these distempers, especially the dry harsh state of the skin in the former, and the occurrence of rheumatic pains in the latter.

From the whole of the facts and considerations furnished by this review of blood diseases, and their phenomena and effects, he deduces two general conclusions. The first is, that those diseases which are admitted to result from a foreign matter, or from a poison circulating in the blood, manifest certain phenomena very similar or analogous, however dissimilar be the morbific agents from each other. The second is, that, in all these diseases, the cutaneous system, or the subcutaneous, is apt to suffer; that the joints are liable to be affected acutely or chronically; that certain internal organs may sympathize with other parts; and that more or less general febrile disorder is induced.

Dr Todd next proceeds to inquire what evidence there is for believing that the two diseases, gout and rheumatism, admit of being classed along with the blood diseases now mentioned?

To establish the justice of this proposition as to gout in the affirmative, he makes the following remarks.

First, it so modifies the functions in general as to give rise to that state of the constitution called the gouty diathesis, which is an aggravated lithic acid diathesis. Lithic acid or even lithate of ammonia is a frequent sediment in the urine. Dyspeptic symptoms are urgent, and the alvine secretions are irregular. In the joints twinging pains are felt. The feet and ankles are more frequently affected than other parts, causing much difficulty and pain in walking. The periodical accession of these symptoms, the febrile disorder and heat with which they are attended, and the affection of various internal organs, as the stomach, heart, lungs, and brain, show the universal diffusion of the morbid principle through the blood.

In this representation there is some truth, with the exception, as it appears to us, of an unphilosophical mode of expression at the commencement. We cannot clearly understand what is meant by "gout modifying the functions in general so as to give rise to that state of the constitution which has been called the gouty-diathesis." The functions are already modified, that is, they are under the influence of a morbid or morbific principle, whether in the blood or not, we do not say, which principle causes the phenomena of gout either in the latent or in the manifest form. But to say that the modification of function is the work of the gout, is, we submit, not only an assumption, but it is reasoning in a circle. It is first assumed that gout is present and modifies the functions; and then it is concluded that this modification constitutes or causes the gouty diathesis and all its effects.

Is it not, we ask, more consistent with fact and observation, to say that disorder of the stomach and its functions, long continued and habitual, causing abdominal plethora and hepatic plethora, gives rise to that state of the system which, favouring the formation of lithic acid and lithate of ammonia in the urine, favours also the developement of gouty symptoms and pains in different parts of the body. It is at least certain that in many persons lithic acid and lithate of ammonia are deposited without giving rise to gout; it is also certain that gouty inflammation passes through all its stages in several cases, and does not terminate in the deposition of lithate of soda in the affected parts; and, on the other hand, in many of the gouty the urine contains no lithic acid or lithate of ammonia, but the ammoniaco-magnesian phosphate. To maintain that lithic acid is the cause of the gout and gouty symptoms is, we conceive, to say that one effect causes another effect, both of which are the result of the same cause.

We think a better method of proving the proposition that gout depends on a morbid state of the blood, would have been to have subjected the blood of the gouty to chemical analysis, and ascertain the fact whether lithic acid or lithate of ammonia could be detected in that fluid. This, we believe, has never yet be done; and, consequently, the most conclusive of all evidence is wanting.

But in the same manner, providing we expect to find lithic acid or lithate of ammonia in the blood of the gouty, we ought to find the ammoniaco-magnesian phosphate in the blood of the same person. Certainly this is not impossible any more than the other; but it has not been yet done, and, consequently, the evidence as to that is in the same imperfect state.

Notwithstanding these objections, which appear to oppose naturally the proposition here maintained by Dr Todd, we do not infer that the doctrine, that the blood in gout is in an unhealthy state, is altogether unfounded. It is very likely that there is in it

some truth. But we do not think it proved that the blood contains the principle here mentioned. All that strict observation warrants is, that there is secreted from the blood iu the course of that disease, in certain textures and at the surface of certain membranes, a new substance, or a morbid fluid rather, containing a new substance. But it does not from this follow that the blood really contains this new substance.

It seems further to be established by fact and observation, that the main exciting cause of this morbid action in the articular tissues, and the consequent secretion or deposit in them, when it does take place, commences, in the first instance, in the stomach or some portion of the alimentary canal; that the first link in that chain which terminates in the secretion of lithate of soda, is a morbid state of the digestive function, and that the last link is a peculiar inflammation of the skin, cellular tissue, ligaments, and synovial membranes of the joints; and, in short, that in the process of digestion begins some morbid action which influences the state of the blood, in some instances the functions of the kidneys and the state of the urinary secretion, and which, in certain circumstances, falls on the skin, ligaments, and synovial membranes of the extremities, and in others, on various internal organs. From this, however, it by no means follows, that the material product of the morbid action, which is deposited at the last link of the chain, is met with or perceptible in all the intermediate links.

We must not, however, take all the reasoning in our own way. We shall give one of the cases adduced by Dr Todd in this part of the inquiry, in order to establish the conclusion contended for by him that gout is a disease of the blood.

"Dr Graves," says Dr Todd, "describes some examples of disease of the spinal cord connected with, and apparently caused by gout. One of these cases occurred in the person of a gentleman, aged about 33. He was subject to attacks of severe colic, preceded or followed by a gouty affection of the feet. After several of these attacks, he became affected with great weakness of his wrists, with pains in his fingers, particularly in the last joints. As the disease progressed these pains became more intense and extensive, and the torture he felt in his hands and arms was beyond description. Paralysis of the upper extremities shortly came on, and this was soon followed by paralysis of the lower. Shortly after the paralytic affection had thus decidedly shown itself, he had an attack of gout in the feet, which was followed by several others in succession. After each attack of pain in the feet, the paralytic state of all his limbs increased, and if he gained a little strength in the intervals between these attacks, a recurrence of the paroxysms always made him worse than before.

"On examination after death, the spinal chord was found to be softened to the consistence of thick cream, opposite the last cervical and first dorsal vertebra."

Now we think, with the utmost deference to Dr Todd, that all the conclusion that can be deduced from this case is, that the action of gout had affected, at the same time, the feet and the spinal chord,—an occurrence which, though perhaps not frequent, is, nevertheless, mentioned by all the writers on anomalous gout from Dr Musgrave down to Dr Graves. The usual course is for the gout to appear first in the external parts, and then to attack the internal parts and carry off the patient. It is clear, however, that all this might be done without the assumption of morbid matter in the blood; and we do not perceive how the facts now stated prove the presence of morbid matter in the blood. Softening of the central parts of the nervous system occur certainly in situations and circumstances so manifold, that we do not understand how their occurrence can be regarded as a proof of disease in the blood.

Dr Todd next undertakes to show that the gouty paroxysm developes itself in depressed states of the system,—a fact which he thinks has not attracted any notice. This, we believe, is a mistake; for all the best writers on gout have noticed that this disease is liable to develope itself in a depressed state of the system, and most systematic authors have noticed the same fact. The author relates, in illustration of this principle, several interesting cases, which will be perused with advantage. The conclusion deduced is the following.

"We learn from such cases, two useful cautions. The first is, that in the treatment of the gouty paroxysm, we should be careful not to reduce the patient too low, lest a new paroxysm be induced. And secondly, that, in the treatment of patients of the gouty diathesis for other diseases, we should be careful to avoid carrying the antiphlogistic regimen too far, for fear of exciting a fit of the gout." —P. 54.

In the next section (IV.) we are presented with a view of the author's mode of explaining the phenomena of gout, by referring them to the operation of a morbid poison. That the reader may be enabled to estimate the force of the reasoning, and also to see the manner in which Dr Todd arrives at his conclusion, we believe the most just course is to give the passage in the words of the author.

"From the various points in the natural history of gout, which have been adduced in the preceding pages, it may be collected that gout is a disease presenting the strongest points of resemblance to those in which it is admitted that a morbific agent is present in the blood. As in them, the joints suffer, the functions of the skin are impaired, the hepatic and renal secretions do not exhibit their normal characters, and certain organs are apt to be secondarily affected, the stomach, the heart, the lungs, the spinal chord, the brain, the eye. From those facts it appears highly probable that there is a peculiar mat-

ter circulating in the blood, which gives rise to the phenomena of gout, by occasioning a disturbance of longer or shorter duration, of greater or less intensity, in the nutrition of parts to which it is attracted; the effects of this morbific matter upon any part seems proportionate to the quantity that is drawn to the part, and when strongly attracted to one part, it is not likely to affect others. Hence in first attacks of gout in strong and healthy individuals, a single joint only is generally affected, but if anything impair the force of attraction of the morbid matter to that joint, the poison flies to other parts, which it will fix upon simultaneously or in succession.

"A safe and most important rule of practice may be derived from this fact, namely, to be very cautious about interfering with the local disturbance which a fit of the gout creates in external parts. For such local interference, by diminishing the force of attraction of the part first affected for the gouty matter, may favour its transference to other places.

"These views derive interesting confirmation from a fact to which many a gouty patient can bear testimony, namely, that a part which had previously been injured, is certain to be the seat of the gouty inflammation in subsequent attacks. If a foot or hand have been sprained, or otherwise injured, the gout will fix itself there, because the injury has exalted the nutritive process in the part, and there is therefore a greater attraction of the elements of the blood to that part, than in the state of health. For the essence of nutrition consists in an attraction between the solids and the fluids by which those elements of the latter which correspond in chemical constitution with the former are drawn into and appropriated by them. It is thus that albumen goes to the albuminous tissues, fibrine to the fibrinous, and so on.

"It seems impossible to explain the phenomena of gout upon any other hypothesis than that which supposes the existence of a peculiar matter in the blood. We cannot regard it as a local affection; such a supposition will not explain its sudden shiftings from one place to another, nor the simultaneous affection of several joints, nor the constitutional disturbance which precedes a gouty attack; still less will it account for that train of morbid symptoms, the aggregate of which constitutes the gouty diathesis. Nor can we suppose it to be a peculiar affection of a particular class of textures, for although the fibrous textures and others connected with joints are most obnoxious to it, it by no means limits itself to them; for all textures and all parts, which the blood visits, are liable to be attacked by it. Moreover, neither of these hypothesis will account for the proneness of the paroxysm to occur, as I have shown it to do, in low and depressed states of the system.

"We can, therefore look for an exposition of the phenomena of this disease, only to that hypothesis which supposes it to result from a contaminated blood. And this opinion acquires confirmation from the two following considerations.

"First: That this disease is always at first connected with defective assimilation, and imperfect excretion; two conditions eminently calculated to impair the quality of the blood, by introducing into it some

abnormal element on the one hand, and obstructing the elimination of some principle which is usually excreted from it on the other. Persons in whom this disease occurs have usually been for some time before living well, the liver has gradually become torpid, the kidneys are affected, and the skin secretes imperfectly. In some these changes may have been going on so silently and imperceptibly as not to have attracted attention until an acute attack has supervened; in others the marks and ailments which accompany the gouty diathesis will have been a sufficient indication that something is going wrong in the system. In a person of gouty habit, as long as the molecular changes, in which nutrition and secretion consist, go on vigorously, a paroxysm is not likely to occur. An inflammatory or plethoric state of the system, such as may be brought on by too high living, is unfavourable to free excretion, and a depressed state of system is equally adverse to both nutrition and excretion; hence, in either of those states, the conditions may exist which would favour the accumulation of a morbific matter in the blood.

"The long continuance of an imperfect assimilation cannot fail to affect, sooner or later, the nutrition of the whole body, and by and by the various tissues come to partake of the nature of the assimilated matter; if it be highly azotized, they will abound in azote; if it be deficient in this great animal principle, they must need it likewise. Nothing is more certain than that we can alter the habit of the body by the nature of the food; if we feed a man highly and work him little, or to an extent insufficient to produce a waste proportioned to the supply, we may induce the gouty diathesis and gout; if we feed him partly on azotized food, but chiefly on the non-nitrogenous articles of diet, he grows fat, and his muscles waste; if we deprive him of fresh vegetables, although he have meat and bread, he becomes scorbutic; and it is worthy of observation, that the difficulty of removing the habit of body thus induced will be always proportionate to the duration of the mode of living by which it had been brought on.

"It is a fundamental axiom indispensable to a sound and comprehensive pathology, that the pabulum of the blood is furnished from a twofold source, namely, from the food reduced in the digestive canal to chyle, and from the effete particles of the various tissues of the body, which are brought to it in a state of solution. The tissues which derive their nourishment from the chyle must of course participate in its properties; if it be adulterated, they must imbibe some of the noxious material; if the spring be poisoned, they who drink of the waters must suffer. And hence it may be shown that the blood receives contamination from two sources; primarily from the morbid chyle, secondarily from the waste particles of the tissues that have been ill-nourished by this bad chyle.

"Secondly: The hereditary nature of gout affords confirmation to the view of its pathology which I venture to advocate.

"It has been argued by some, that the hereditary transmission of gout is strongly in favour of its being a disease of the solids. I am entirely at a loss to discover a single sound argument in support

of this opinion. Indeed it is opposed by the analogy of all diseases known to be hereditary, for in all of them the blood is contaminated either primarily or secondarily, as in phthisis, diabetes, cancer, the hæmorrhagic diathesis. The generative act is, in its essence, one of secretion; the embryo being the result of the combination of two secretions, the one formed by the mother, the other by the father. These secretions are composed of matter separated from the blood of each parent respectively, and it is obvious that the body which results from the union of both, must partake of the properties and characters of both. And thus it is that we meet with children combining in equal proportions the qualities of both parents, while in others those of the father or of the mother predominate, as if the peculiar properties of the matter derived from one parent were such as to neutralize those from the other. The same thing appears throughout the inferior races of animals, and the breeders of horses and cattle know well how necessary it is to select both dams and sires free from blemish.

"When, then, a disease is capable of being transmitted from parent to child, we may assume that it is a disease of nutrition—one in which both solids and fluids are imbued to a greater or less degree with the morbid element, and which is transmitted through the fluids—the source of all the secretions.

"Now gout is primarily induced by errors of diet; these give rise to defective assimilation, from which results a contaminated blood. This, in its turn, nourishes the tissues badly, which consequently share its impurities; and they, in restoring their effete particles to the current of the circulation, again contaminate the nutrient fluid; and the secondary organic compounds, which result from the decomposition of these tissues, are of an impure kind. A person who has had a single attack of the disease (not having inherited in himself), and who, by regimen and other means, has restored the healthy nutrition of his system, would not probably transmit the disease to his offspring; but one in whom the diathesis has been fully established, even although he may have been exempt from an acute attack, must, in all probability, be the medium of conveying the seeds of this malady to his posterity.

"Perhaps we cannot adduce a more striking fact in proof of the influence which a morbid matter introduced into the blood can exert upon the subsequent nutrition of the body, than the power of vaccination, in diminishing or preventing the susceptibility of imbibing the poison of small-pox. Less than a drop of a certain fluid introduced into the blood at an early period of life, which may produce no appreciable effect beyond a slight febrile disturbance, and a single pustule, is yet capable of so modifying the whole system, that it resists the influence of a poison to which it must have succumbed, if it had not been thus protected. Nor is the protection thus obtained confined to the individual vaccinated; for recent researches render it probable that his descendants also may derive a degree of protection from the modification which the constitution of their parent underwent by the operation of the vaccine virus.

"Another remarkable circumstance may be mentioned to illustrate the silent influence of contamination of the system of the parent upon the offspring, even when all signs of infection had ceased to show themselves. It now and then occurs that a woman suffers abortion at the sixth or seventh month of pregnancy; the child is dead and syphilitic: on inquiry, both parents are free from any present symptom of the disease; but on questioning more closely, it appears that the father had had syphilis some time before, and that the poison of that disease had never been completely eradicated from his system. The mother will not produce a healthy child until both she and her husband have been subjected to a course of mercury. In these cases, the offspring is tainted by a poison which lurks unperceived in the blood of one of its parents.

"These views, if well-founded, as I believe them to be, must have an important bearing on the general doctrines of disease. They seem to show that that must be a narrow and imperfect view of pathology which looks for the causes of disease in deranged solids, or in altered fluids exclusively. The laws of nutrition forbid us to suppose that a solid can be diseased without some change occurring in the fluids; and still more, that the fluids can be altered without the solids suffering. It is true that many a slight local disease or injury may exist without appreciable change in the fluids, and it does not follow that, because we are unable to detect it, no change has occurred; but we can scarcely adduce an instance of even the slightest alteration of the fluids taking place, without the solids suffering either functionally or organically. The pathology which is most consistent with the laws of the nutritive process, as developed by the researches of modern times, may be termed a solido-humoral pathology."—P. 55-65.

It is not unworthy of notice that the same hypothesis was maintained, we shall not say with how much or how little reason, nearly ninety years ago by Dr Robert Whytt, at that time Professor of the Institutes of Medicine in the University of this place, and certainly a person whose talents were of a rank not inferior to any of those that have succeeded him.

"From what has been said," says Dr Whytt, "it may appear that some morbid matter in the blood, either arthritic or of another kind, may be often the cause of nervous complaints. When this matter is carried smoothly along with the blood, without forming obstructions in any of the vessels, or irritating the nerves, it gives little trouble. When it remains fixed in the extremities, or the muscular parts of the trunk of the body, it will only occasion aching pains of the goutish or rheumatic kind; but when it is deposited on such of the viscera as are very sensible or by sympathy are apt strongly to affect almost the whole body, it may produce most of those symptoms which have been commonly called nervous, hypochondriac or hysteric. This matter may in general act either by its viscidity in obstructing the smaller vessels, and

thereby stretching too much their sensible fibres and nervous filaments, or by its acrimony in disagreeably affecting the extremities of those nerves which it touches.

"It is to be observed, however, that the kind and violence of the symptoms occasioned by this morbific matter, will not only be different according to the parts which it affects, but in proportion to the greater or lesser natural delicacy or sensibility of the patient's nerves.

"Hence it seems to be, that men of otherways hale and strong constitutions, and some robust women, are liable to a regular gout, and but little to nervous complaints. Their firmer fibres and less delicate nerves do not predispose them to the latter, and the strength of their digestive organs, and vascular system, enables them to throw off the arthritic matter on the extremities, by which means the body is cleared of it.

"Men of a middle constitution, between the delicate and strong, are, from this morbid matter, affected with pains of the cold rheumatic kind, and various nervous symptoms in a lesser degree; and sometimes also with a fit of the true gout. But in them this distemper is not commonly so completely formed, as to clear the habit of the arthritic matter, at least for any considerable time; for soon after the imperfect fit of the gout, their old complaints begin to return."

Again, "Persons who have been but little troubled before with those symptoms commonly called nervous, upon the rheumatic or rather gouty pains leaving their feet, hands, or loins, have been seized with an irregular intermitting pulse, giddiness, faintness, difficulty in breathing, nausea, and vomiting, flatulence in the stomach and bowels, depression of spirits, and other symptoms of the like kind.

"Such complaints, if the patient has never had the gout, are generally called nervous; but if he has been subject to it, are readily enough ascribed to the arthritic matter leaving the extremities, and fixing upon the head or viscera of the thorax or belly.

"This difference, however, may be observed, that the symptoms arising from the retrocession of the true gout, are generally more violent than those which are occasioned by a rheumatic or imperfect arthritic humour wandering through the body,

"Upon the whole, it may appear, that one very frequent occasional cause of many nervous, hypochondriac, and hysteric symptoms, is some acrid matter in the blood, commonly no other than the arthritic humour, the cause likewise of the chronic rheumatism and true gout."

"Physicians have widely differed about the nature of that humour which is the cause of the gout; some making it tartareous or acid, others urinous or alkaline. But, sensible how vain all such disquisitions are, I shall not attempt to define the nature of

the noxious matter in the blood, so often the cause of nervous hypochondriac and hysteric disorders, further than as I have already endeavoured to shew, that it is most commonly of the arthritic kind."*

Here, therefore, we find the humoral pathology in all its glory; and, indeed, it was at the time to which we refer, the principal and only hypothesis with all those who had any hypothesis on the cause of gouty symptoms. Stahl, however, who was a contemporary of Whytt, and the opponent of many of his doctrines on the cause of the phenomena of life, took a different view, and, indeed, was the first pathologist who clearly and decidedly maintained the influence of the vital and organic properties in accounting for the phenomena of gout. This was done in a manner still more complete and popular by Cullen; and after the refutation by the last physician, no pathologist of any note has attempted to ascribe the phenomena to any change in the state of the fluids alone. Cullen maintained that gout was a disease partaking of the nervous and of the inflammatory character, at once nervous in its origin and general character, but inflammatory in most of its effects; and most physicians appear since that time to have been disposed to take this theory as sufficiently probable, or to have abandoned theory altogether, and not to have entertained any fixed or definite ideas on its nature at all. We have already assigned reasons why probably it was difficult to form any distinct or comprehensive theory on this topic.

This enterprize Dr Todd has undertaken; and he proceeds to inquire what is the nature of the morbid element which is capable of so modifying nutrition as to produce the phenomena of the gouty diathesis or the gouty paroxysm?

With this view he goes over the usual ground as to the presence of lithic acid in the blood, and the lithic acid diathesis, and he shows that he is quite aware of the objections which may be urged against the circumstance of the presence of this acid, either in the blood or in the urine, being adequate to explain the phenomena of the disease.

"An adequate theory of gout must explain," he tells the reader, "1. the frequent accompaniment of the developement of a large quantity of lithic acid with the disease; 2. the occasional occurrence of gout when this acid cannot be formed in undue quantity, as in the cases of gout appearing in low states of the system already mentioned; 3. it must account for the formation of a large quantity of free acid in the system, as appears from the undue acidity of the digestive organs, and of the sweat; and lastly, it must explain the pathognomonic character of the disease, namely, the formation of lithate of soda in various parts of the body."

He then controverts the justice of the theory proposed by

* The works of Robert Whytt, M.D. &c., 4to, Edinburgh 1768.

Liebig, that the presence of lithic acid in the system is owing to the deficiency of oxygen. Against this notion he urges various objections, which it is unnecessary here to detail, because, though all valid, they would not advance us one single step on the road to explain the phenomena of gout and the gouty diathesis; and this is, indeed, confirmed by the admission of the author, who arrives at the conclusion, that, in the present state of our knowledge, it seems impossible to determine the correct theory of gout, and that it is merely highly probable that the peculiar gouty matter is, in the first instance, derived from the stomach or duodenum, inasmuch as a disturbance in the functions of those parts is an invariable antecedent or accompaniment of the hot fit.

We feel it requisite, however, further to observe, that, in the above statement of an adequate theory of gout, an omission, which we conceive important is made. It is not the great abundance of lithic acid, nor even the presence of acidity in the system, that, if accounted for, would explain the phenomena of gout. The truth is, that much lithic acid may be present and deposited in the urine without causing gout at all; and, as already stated, lithic acid is deposited in many different inflammatory states of the system. The acid odour also is common in rheumatism as in gout. A more important circumstance to be noticed in every explanation of the chemical phenomena of the disease, theory we shall not call it, is the fact, that in the gouty diathesis, and in actual chronic gout, the urine most commonly contains not lithic acid or lithate of ammonia, but the phosphate of ammonia and magnesia. Such urine presents a pellicle on its surface in the course of a few hours, and passes speedily into very offensive decomposition. While we insist on this as an important symptom in the humoral pathology of the disease, we cannot elevate it into the rank of a cause. Most probably it is an effect of that lesion in the digestive function which causes the gouty pains and the gouty paroxysm.

Upon this point, however, of the cause of gout and gouty symptoms, our readers may wish to know the final conclusions at which Dr Todd arrives. He thinks that we must look for the matter of gout as a compound derived from a product of unhealthy action in the stomach and duodenum, which, being absorbed into the blood, unites there with some element of the bile, which has been suffered to accumulate through the defective secreting action of the liver. This compound, he further argues, may exist in the blood in variable quantity, and for an indefinite period, contaminating the whole frame, and the offspring from it, and may thus give rise to the gouty diathesis, or it may be liable to periodical accumulation, which can only be got rid of by periodical paroxysms.

In the next section the author considers the treatment of gout, for the general management of which, he thinks experience has provided us with excellent rules, independently of those precepts which may be deduced from correct views on the pathology of the disease, or from our knowledge of its natural history. His observations on this part of the subject are perfectly correct, and we need only refer to them generally. He reduces the general curative indications to two,—one, to devise a mode of treatment capable of removing or greatly modifying the diathesis; the other, to determine a curative method, adequate at once to relieve present symptoms as speedily as may be compatible with the complete elimination of the gouty matter.

The first of these is subdivided into other three, *first*, to invigorate the digestive organs; *secondly*, to promote the elimination of gouty matter; and *thirdly*, to obviate the tendency to the formation of lithic acid. On these different objects the author offers several judicious observations; and among other means for eliminating the arthritic matter, which is to be accomplished by restoring the action of the liver, the alimentary canal, the kidneys, and the skin, he inculcates strongly the use of pure water, and watery ptisans for drink, and keeping up the action of the skin by bathing and washing, hot and cold, exercise, and friction.

The use of meadow-saffron, which he allows under particular circumstances, he restricts to the following conditions.

" 1. Colchicum should not be given in the asthenic form of gout.

" 2. Colchicum should never be given at the onset of a paroxysm, nor until the bowels have been duly acted upon by mild purgatives.

" 3. The first doses of the medicine should be very small; they may be gradually increased.

" 4. Colchicum should be always administered at first uncombined with any other medicine, until the practitioner has satisfied himself that it is not likely to disagree with his patient. And indeed there is always a disadvantage in administering this medicine in combination with others; since it may become difficult, if not impossible, at times, to determine what effects should be ascribed to the colchicum, and what to the other ingredients.

" 5. It should not be administered so as to excite nausea, vomiting, or purging. These effects should be regarded as indicative of the unfavourable operation of the medicine.

" 6. Colchicum may be regarded as acting favourably, when, under its use, the urine is increased in quantity, a more abundant bile is discharged; when the fæces, though solid, are surrounded by mucus, and the skin secretes freely.

" 7. The effects of colchicum should be carefully watched, as, like digitalis and other medicines, it is apt to accumulate in the system.

" The use of this medicine seems chiefly applicable to the sthenic

form of gout, which occurs in robust constitutions, and in the prime of life; but it is almost inadmissible in persons advanced in years, who have had several attacks, and in whom the malady would seem too deeply rooted, to be influenced by the temporary administration of this remedy."—Pp. 105-106.

Dr Todd next undertakes to show that the phenomena of rheumatic fever or acute rheumatism depend on the blood containing a particular morbid element, the complete elimination of which is necessary to the perfect cure of the disease.

In the seventh section on this subject, Dr Todd attaches considerable importance to a notion which he thinks is new and peculiar to himself, in the relation between rheumatism and disease of the heart. This notion is, that when the rheumatic diathesis is established in the system, it may, without causing an open or distinct attack of rheumatic fever, or external rheumatism, evince its existence only by affecting one or other of the textures of the heart, that is, either the pericardium or the endocardium, and especially the mitral valve. Now we cannot pereive that there is in this doctrine, as we understand, anything new or unknown. It has been observed that this cardiac lesion may take place either after mild external rheumatism, or without it, yet with the presence of the rheumatic diathesis, or it may occur before the external rheumatism has shown itself. The latter result we have seen several times; and it is mentioned in so recent a work as that of Dr Macleod. We may perhaps underrate the importance, or rather the novelty of the fact stated by Dr Todd. But we trust that the experience of physicians shows that we do not.

In the eighth section the author brings forward his proofs of the proposition now advanced, and compares the phenomena of rheumatism with those of several diseases in which the blood is impregnated with a poison. The part to which he refers is infection of the blood by purulent matter, from phlebitis or other causes; and he argues that, as those cases of purulent infection, which constitute the unfavourable form of puerperal fever, have been considered in rheumatic fever, and as the cases adduced by Bouillaud to show rheumatism terminates in suppuration, are connected with the puerperal state, so the phenomena of rheumatism must, in like manner, depend on a morbid or poisonous element in the blood. He forthwith mentions the case of a patient aged 23, in whom rheumatic pains and swellings of the joints were shown, after death, to depend upon the presence of purulent matter within the joints, and destruction of the cartilages; and the analogous fact mentioned by Dr Beatty of Dublin, that pain and redness of the large joints, in puerperal females, with abdominal tenderness, most usually indicates the presence of purulent effusion within the articulation. In like manner, he argues, that the resemblance between the early

symptoms of glanders and rheumatic fever derive a similarity in the nature of the cause.

These arguments, we fear, are not conclusive, it might be said scarcely plausible, and we must say that we are sorry to observe a writer of the talent of Dr Todd adopting them. That the articular pains which puerperal females feel when they are attacked with the symptoms of purulent deposit in any of the joints, have been mistaken for rheumatism, or have been called rheumatic, is simply a proof of the carelessness and want of diagnostic powers in those who have done so. It is sufficient to say, that, though pueperal females are liable to acute pains in the joints, yet a distinction may always be drawn between those which are rheumatic and those which indicate suppuration within the joint, not only by the swelling and more severe and lasting pain of the latter, but by the fact, that in rheumatism several joints are affected, whereas in purulent deposits only one in general is affected, and most usually one knee. As to the resemblance between the early symptoms of glanders and the symptoms of rheumatism, it is well-known that the early symptoms of all febrile and inflammatory disorders are accompanied with pains in the limbs, which, by careless observers, are called rheumatic pains. But we can see no ground for admitting that for this reason the pains so appearing are produced by the same cause. Indeed, any one who has ever seen a case of glanders, and compared it with acute rheumatism, must be satisfied that there is between these two distempers a very great and striking difference.

Dr Todd farther argues, that, as the chronic fevers which follow rheumatism affect parts symmetrically disposed, this must be regarded as a proof of the morbid state of the function of nutrition during the presence of that disease.

The author then proceeds to combat the doctrine that rheumatic fever is merely symptomatic of a local inflammation affecting one or more joints. 1. He argues that it does not explain the peculiar diathesis, nor the condition of the disease to a certain period of life. 2. It will not account for the affection of the heart. 3. He maintains that we have no satisfactory evidence that the articular affections are truly of the nature of ordinary inflammations. 4. While, in ordinary inflammation of a joint, the fever is always directly proportioned to the local disorder, and depends entirely on that disorder, in rheumatism the local disorders are merely effects of the general diseased state of the system. 5. If it be argued that the inflammation of the heart or pericardium in rheumatism is a proof of the inflammatory character of the distemper, it may be answered that the constant motion to which that organ is maintained favours the occurrence of true inflammation, whereas the rest to which rheumatic joints are confined prevents the developement of that process ; and further, it is known

that when rheumatic joints are kept in motion inflammatory products are formed. And lastly, the hypothesis, that rheumatism is an inflammatory state of the fibrous membranes, does not hold good, since it is found that rheumatism, in certain circumstances, affects the synovial textures.

The force of the last argument, however, which is perhaps greater than is imagined, the author immediately impairs and almost destroys, by admitting that, when the fibrous membranes are affected, the synovial membranes, which are in close contact with them, cannot escape, neither can the synovial membranes be inflamed without affecting their fibrous coverings. The justice of the inferences now made must be manifest to every one, who is aware of the anatomical relations of the fibrous and synovial membranes; and it appears to us that the fact now stated, instead of invalidating the general doctrine as to the disease being of an inflammatory character, rather confirms and corroborates that doctrine.

This leads the author to call in question the correctness of the distinction made by Dr Chambers and Dr Macleod between fibrous rheumatism, on the one hand, and synovial or capsular rheumatism on the other, and to maintain the opinion, that the latter disease is merely one of the forms of gout. The grounds on which he founds this opinion are the facts as to the character of the disease, stated by Dr Macleod himself, and formerly mentioned in this Journal, Vol. lvii. p. 444. This view, we confess, appears to us probable, and, indeed, making a near approach to the truth, for the synovial rheumatism assuredly does take place in connection with the gouty diathesis both in the ankles and in the knees; and though there is nothing more obscure or unsatisfactory than the views of physicians, on the etiology and pathological characters of gout and rheumatism, yet it has always appeared to us that this form of the distemper must be regarded, at least, as rheumatic gout.

We, nevertheless, do not perceive that the admission adds anything to the reasons and arguments which Dr Todd advances to prove that, in rheumatism, general nutrition is disordered, not by local disease nor by any impression on the nervous system, but by the developement of a morbid matter in the blood, which visits every part to which this fluid is distributed, but which is attracted to some textures more than to others. This synovial rheumatism may or may not be of the arthritic character; but it does not thence follow that it depends on any morbid matter. We believe that, for a long series of years, at least since Cullen wrote, no one whose ideas were founded on observation regarded rheumatic fever as anything else than a general disorder of the whole constitution; but whether this implies the presence of a poison or morbid matter, is a point which must be left for observation and experiment to determine.

Dr Todd next inquires into the nature of this alleged morbid matter, and after admitting the difficulties of the problem, in the absence of any morbid secretion within the joints or around them, as in gout, adopts the views of Dr Prout, that, as the skin is the great eliminating apparatus of lactic acid, and as the function of this organ is much perverted, and bad food or too little food may cause the formation of lactic acid more profusely than it is excreted by the skin,—therefore, the presence of lactic acid in the blood is the main cause of the symptoms of rheumatic fever and rheumatism. The author then pronounces a well-merited eulogium on Dr Prout, whose services to the department of animal and organic chemistry have been so great and valuable. This will be gratifying to every one who knows and appreciates the scientific researches of Dr Prout. Assuredly, by no single individual has so much light been thrown upon many of the obscure morbid processes of the great animal laboratory; by no one has so much really correct and substantial information been contributed; and of no one, will the reputation stand so high or increase so steadily, as an able chemical philosopher, as that of Dr Prout. We have only to add, that we regret to observe, that several persons who get credit for great chemical and pathological knowledge, have not been so candid as Dr Todd in acknowledging their obligations to this source.

In the ninth section the author considers the question, whether the unhealthy secretions of the uterus may afford materials for the production of rheumatic matter? To elucidate this question, he details first the case of a stout healthy-looking woman of 23, in whom, though evidently with indications of previous rheumatic disorder, exposure to cold immediately before the catamenial period was followed by menorrhagia, uterine pains, febrile symptoms, and, at length, rheumatic fever, with an eruption over the person of erythematous papulæ and patches. This went through the usual course, and left the patient, after three weeks, free from uterine pains, and finally in a state of good health.

The same course of phenomena, he thinks, can be recognized in gonorrhœal rheumatism, as it has been named. If the gonorrhœal secretion be effectually cured, the articular pains will cease; but as long as the blenorrhagic discharge continues, the rheumatic symptoms do not yield.

In dysmenorrhœa also, especially that with membranous discharges, these are all the conditions, he argues, for the production of a depraved secretion, which remaining in contact with an absorbent surface, may enter the vascular system and contaminate the blood.

In short, Dr Todd maintains that the state of the uterus and its secretions must exert considerable influence in causing a state similar to, or the same with rheumatism, and that in cases where

the uterine secretions are imperfect in quantity and quality and not duly thrown off, but are accumulated in it, a diathesis may be met with in females resembling the rheumatic or the gouty, and deriving its chief, though not its only origin, from the abnormal secretion of the uterus.

The author then directs attention to chronic rheumatism of the joints and its morbid anatomy. Though rheumatism, he allows, does not usually cause immediate destruction of the articular textures, yet often in the chronic state various changes take place in the ligaments, in the periosteum of the ends of the bones, in the tendons of the muscles inserted into them, in the fibrous fasciæ, in the synovial membranes, and the subsynovial areolar tissue.

In several cases, without the occurrence of an acute rheumatic paroxysm, the chronic affection of the joints consists in an effusion of synovial fluid within the cavities, preceded by pain in some part of the joint, which is aggravated by pressure or motion. When the effusion is not excessive, the pain is sometimes relieved. In other instances, however, it continues; and, as the effusion advances, it is accompanied with or succeeded by the pain of distension. This chronic affection is most frequently observed in the knee. joint. The author thinks these disorders are analogous to gout; and they certainly bear some resemblance to the effects of that disorder on the articular synovial membranes.

In this disorder the articular cartilages are liable to be absorbed, and their place succeeded by the ivory degeneration. When this does not take, a deposit of ligamentous substance is extended over the prominent points and heads of the bones, and many ligamentous productions are observed to dip down into small cavities in the head of the bone, and seem as if they were absorbing the bony particles.

In other instances, there are found in rheumatic joints numerous small bodies, irregular in shape and size, loose or attached, and in all almost the synovial membrane is thickened and prolonged at certain points into fringes or processes like papillae.

These effects Dr Todd thinks cannot be ascribed to chronic inflammation of an ordinary kind, but are to be regarded rather as indications of abnormal nutrition, occasioned by the presence of a peculiar matter in the nutrient fluid, affording some points of resemblance to chronic inflammation, but differing from it in others; and hence, though he regards the disorder as allied to gout, he thinks the term chronic rheumatism of the joints preferable to that of chronic rheumatic arthritis proposed by Mr Adams.

This disease may attack any of the joints. But it appears first to have attracted attention in the hip-joint. It may take place in early life; but it is much more commonly seen after the meridian of life or in advanced age. It is most common

among the labouring poor, and hence, though not much seen in hospitals, it is observed in every variety in workhouses. Dr Todd thinks it is more abundant in Ireland, where its causes are abundant, than in England, where they are less frequent. Of its prevalence in Scotland he states that he has no knowledge.

We may add, however, that it is not uncommon there, as we have seen it both in the hip-joint and in the knee-joint.

The description of this disease as it takes place in the hip-joint, as given by Dr Todd, may be recommended as very correct.

"When the hip-joint suffers from this disease, both the acetabulum and the head of the femur become much altered in shape, the former being deeper and wider than natural, the latter being flattened and expanded, and assuming somewhat the shape of a turnip, or being lengthened into the form of a cone. Both surfaces are deprived of cartilage; the fatty body, which in health occupies the non-articular portion of the acetabulum, and the ligamentum teres, disappear; and eburnation is apparent, to a greater or less extent. over both articular surfaces. There is more or less of the exuberant osseous growths around both the acetabulum and the head of the femur: but the most remarkable feature is that the neck of the femur is shortened to a greater or less degree, so that the position of its head with respect to its shaft is sometimes considerably changed. So remarkable is the change in the general shape of the upper extremity of the femur, that a bone thus altered has been not unfrequently mistaken for, and exhibited as an example of united fracture of the neck of the femur.

"A patient labouring under this disease of the hip-joint, has the affected limb much shorter than the other, and consequently he exhibits considerable lameness in walking. Sometimes he merely rests the toe on the ground, but not unfrequently he can place the sole quite flat,—a circumstance which adds not a little to the awkwardness of his gait. The foot is everted, as in fracture of the cervix femoris. So peculiar and characteristic is the gait of persons labouring under this disease, that I have frequently detected it in persons walking at a distance in the street, or on the road. As rotation of the thigh is almost impossible, walking is attended with circumduction of the affected limb. There is flattening of the nates of the affected side, and some atrophy of the muscles of the thigh, which, probably, is owing to a considerable diminution in the range of all the motions of the joint. When the weight of the body is thrown on the affected joint, considerable pain is felt, which quickly subsides when the horizontal posture is assumed. In the morning the patient feels stiffness in the joint; at night, after having used it through the day, he suffers considerable pain, until the horizontal posture brings him relief.

"There are many circumstances connected with this affection of the hip, which might lead us to doubt its rheumatic nature. Thus, it is very commonly confined to this joint; it is rare even for that of the opposite side to be attacked simultaneously with it. Mr

Adams says, 'This disease, when once fully established in the hip-joint, rarely or never extends to the other articulations.' It appears that, in some of the cases, traces of rheumatism have not been apparent in the previous history; I must confess, however, that I have met with none in which complaint has not been made of pains of rheumatic character in some of the other joints, although further signs of disease of the articular textures were wanting."—Pp. 173.

In the eleventh and concluding section, the author considers with attention the methods of treatment indicated for the removal or alleviation of the different forms of rheumatism now enumerated.

For the removal of the rheumatic diathesis, Dr Todd recommends the employment of purgatives to restore the healthy action of the bowels. Small doses of calomel and jalap, followed by sulphate of magnesia, and the carbonate of magnesia, the latter to correct acidity, are recommended as most applicable. To the state of the skin also great attention must be paid, by means of warm clothing, the warm bath, the vapour bath, the hot air bath, and proper exercise. Tonics, especially iron and sulphate of quinine, are next recommended; sea-bathing and the shower-bath; the internal use of iodine, if the periosteum be much affected; and diaphoretics, as guaiacum, Dover's powder, and sarza, in states where the system requires these remedies.

Among local applications, he speaks most highly of blisters repeatedly applied, and iodine paint, where the synovial sheaths and membranes are affected. The thermal springs, both of this country and the continent, come next as remedial agents.

In the management of rheumatic fever the usual antiphlogistic evacuant and antirheumatic remedies are recommended. To general blood-letting alone he is averse. Cathartics and meadow-saffron, he thinks, or guaiacum, followed by opium, if properly used, are quite sufficient to remove the disease, and carry it, in general, to a favourable termination. He seems to believe in the odd fancy, that blood-letting favours the attack of the disease on the heart.

It is rather singular, that, in speaking of the treatment required for chronic rheumatism, and especially that for synovial rheumatism, Dr Todd says not one word, good or bad, of the influence of the application of cold water. There seems, nevertheless, strong reason to believe, that, whatever be the merits or the demerits of the hydro-therapeutic method, it is remarkably well adapted to this form of the disease. This we say from having heard and read a good deal of the efficacy of this method of treatment in the synovial rheumatism, and without saying either good or evil of the author and promoters of that system, we think that it here deserves a fair trial. Between the internal use of cold water, indeed, which excludes all pernicious potations, and the external methodical application of

cold water, which restores the action of the skin, it seems most rational to think that, if this form of disease be at all curable, it is thus most likely to be cured. The internal employment of cold water, on the one hand, is calculated to alter most effectually all the fluids of the body, and thus completely remove all morbid elements;—a result which we are surprised to find has escaped the notice of the present indefatigable advocate of the humoral pathology. The external application of the same element is calculated, by cleansing the surface of the skin and exciting its action, to restore its energy and re-establish its functions; and thus remove those diseases which have mainly been produced by its impaired and perverted action.

Among other pieces of information communicated by Sir Charles Scudamore in his recent visit to the hydro-therapeutic establishments of Germany, we find that Mr Mayo has been for some time, in consequence of rheumatic affections of the ankles and knee, resident at Marienberg near Boppart, on the Rhine, where he has been employing this method, it is said, with great benefit. So far as we can understand the nature of the disorder, from the description, the distemper under which Mr Mayo has been suffering is the synovial rheumatism; and if this be the case, the remedial influence is tolerably manifest.

The account now given of the present work cannot fail, we trust, to communicate a clear and just idea of its merits. But we further hope that it will induce many to study the volume with care.

Dr Todd is well entitled to the thanks of the profession for the able manner in which he has expounded his pathological views on the nature and causes of gout and rheumatism; and his book deserves the careful perusal of every one who wishes thoroughly to understand these diseases. If, in the present account, we have not adopted his views, this must be ascribed not to our conviction that they are unfounded, but simply to the fact, that the hypothetical opinions which the author brings forward require for their support a greater number of facts than we yet possess in any single treatise, and a longer time for consideration and verification than they have yet received. One principal use of the hypothesis of Dr Todd is, that physicians may observe cases of rheumatism and gout, and compare their phenomena with the hypothesis; and by proceeding in this matter they will at length be able to appreciate its truth, to recognize its deficiencies, and rectify its errors.

ART. II.—*Recherches Experimentales sur l'Inanition.* Par M. CH. CHOSSAT, M. D. 4to. Paris, 1843. Pp. 202.—*Experimental Researches on Inanition.* By Dr C. CHOSSAT.

THE Royal Academy of Sciences awarded to M. Chossat the

Gold Medal for Experimental Physiology for his interesting experimental researches on Inanition; and the important results at which that gentleman arrived, and the light which his memoir consequently sheds on many interesting physiological, pathological, hygienic, and therapeutic points must convince every one that that medal was worthily bestowed.

M. Chossat had two objects in view in undertaking his experiments; *first*, what were the exact effects produced by a complete deprivation of food? and, *secondly*, what the effects of an incomplete deprivation, or of a supply very insufficient for the purposes of life? The experiments of Redi, Collard and Martigni, and many others, besides the many isolated published cases of prolonged abstinence, still left much to be ascertained, and M. Chossat was anxious to discover, if possible, whether the phenomena attending the complete deprivation of food were constant and invariable in all classes of animals.

Before proceeding to experiment on animals by depriving them completely of food, he made numerous observations on well-fed animals, to serve as a point of comparison with those deprived of sustenance. It is known that there exist great differences in the quantity of food consumed by different animals, as compared with the weight of their bodies;—some eating in the course of the day twice their own weight, while others, as reptiles, do not consume their own weight even in several weeks. His object was therefore to arrive at some general facts; and some pigeons and turtle-doves were confined, liberally supplied with food and water, their weight before, many times each day during, and after the experiment, were carefully noted and compared with the quantity of food consumed at each period of the day, &c. His results were, that the weight of the body varied each day, and during each period of the day, being in general proportioned to the quantity of food consumed. Thus, on an average, turtle-doves consumed daily an amount of solid food equal to one-tenth of their weight; but pigeons an amount equal to one-thirteenth. From this he argues that, if all birds eat a similar proportion of aliments, it might be safely inferred that those whose animal heat was highest, would also be those which would consume most food. He also found that the quantity of water used was somewhat greater in weight than that of the solid food. Two-thirds of this water was again ejected with the feces, and the other third was probably passed off with the exhalations. The dried feces amounted to very nearly a fourth of the weight of the corn consumed as food.

These experiments served as a point of comparison for those which he made on the same animals when completely deprived of food. M. Chossat's experiments on inanition, as he terms it, or starvation, were made on pigeons, turtle-doves, common fowls,

guinea fowls, guinea pigs, rabbits, and also several of the cold-blooded animals, as frogs, tortoises, serpents, &c.

Very many experiments were made with each of these species of animals, upwards of one hundred animals having been apparently sacrificed in this way, and the results obtained justify the deduction of general conclusions which may be deemed applicable to most animals. In conducting these experiments, M. Chossat allowed to about one-third of the animals the use of water; and, as was stated above, of the rest some were allowed a very limited supply of food much less than would sustain life, and the others were totally deprived of all food.

Forty-eight warm-blooded animals of all the species were totally deprived of food and drink, and the first important point ascertained was the gradual but constant diminution of weight. If the loss of the first day be abstracted, the loss of weight till towards the close of life was very nearly the same each day. The first day always exhibited a greater amount of loss, in consequence of the bowels evacuating the remains of the last food. All things being otherwise equal, and taking a period equally distant from the hour at which the inanition began, the loss was great in proportion to the bulk of the body. Towards the end of life, an increased amount of diurnal loss in weight was observed,—a circumstance attributable to the increased amount of alvine evacuations, or even smart diarrhœa which often then occurred. But this increased loss was observed to cease some hours before death, as if the other secretions were suspended like the exhalation of carbonic acid and water.

One of the most interesting points ascertained by M. Chossat, was the absolute average amount of weight lost before death took place; and it is a remarkable circumstance that in almost all animals, when subjected to the same exact treatment, the amount of loss of weight compared with that of the body was nearly the same. Generally speaking, the larger and fatter the animal, the greater was the absolute amount of loss before death; but even in these the proportional loss, as compared with the weight of the body, was nearly the same as in leaner animals. The average result of all his experiments showed that before death ensued the weight of the body was reduced four tenths of what it had been when they were shut up to be starved. This loss of 0.4 of their absolute weight occurred in all classes of animals subjected to experiment, in reptiles, birds, and quadrupeds, so that it seems to be a general law of nature that, when the destructive agencies around us consume at one and the same time four tenths of the animal frame, death should ensue. This law appears, however, from M. Chossat's experiments, to be modified by certain other circumstances. Thus, if the animal be loaded with fat, it some-

times lives till it has lost 0.5 (or one-half) of its weight. Age too exerts a powerful modifying influence. Very young animals often die after loosing only 0.2 of their original weight, and the loss in them never exceeds 0.4.

The time which an animal, deprived of all sustenance, will live, varies much. In birds and mammalia the average duration of life under inanition was nine days. The maximum, however, was twenty days and a half, and the minimum a little more than two days. Here again age exerted a powerful modifying influence. In very young animals death occurred by the end of the second day, while in adult animals the average duration of life was from fifteen to eighteen days. It is, however, a remarkable circumstance, that the longer life was prolonged, or to be prolonged, the less was the amount of daily loss; and the sooner death occurred the more rapid was the diurnal loss of weight.

In the case of reptiles, and fishes the experiments proved that they died when they had lost the same proportional amount of weight as the birds and quadrupeds, that is, about four-tenths of their original weight. The time they lived, however, under inanition was greatly prolonged. Their nutritive movement being much slower, they lived in general about twenty-three times as long again.

The next series of experiments undertaken by M. Chossat are those which, both in a physiological and pathological point of view, are even more important than the preceding. The same species of animals were allowed a very insufficient quantity of food—a quantity far below the demands of the system. These experiments consisted of three kinds. The first, in which the animals were allowed a very limited supply of both food and drink; the second, in which they had only an insufficient supply of solid food; and the third, in which they had drink only.

In the first series, where they had both food and drink, but in very insufficient quantity to sustain life, it was singular to remark that when they died their loss of weight was found to be very nearly the same as if they had been entirely deprived of food. The duration of life, however, was nearly double what it would have been had they been subjected to absolute starvation. In those cases in which the food, instead of being suddenly diminished to the insufficient quantity, was gradually reduced to it, the amount of proportional loss of weight of the body slightly exceeded the 0.4 before death occurred. The weight of the feces, too, corresponded not only to that amount of food which was given daily, but also to that of the animal structures of the body which had been destroyed by the agencies of life to supply the want of sufficient nourishment.

It is a common belief since the days of Redi and Haller, that, if water be allowed to an animal under starvation, its life will be some-

what prolonged. The experiments of M. Chossat, to a certain extent, bear out this belief, but he has ascertained relative to this point several very curious facts. In the case of reptiles, the allowing a supply of water to them, in almost every case, prolongs life. In the case of quadrupeds it somewhat prolonged life, but had no influence on that of birds. It was remarked as an extraordinary fact, that this prolongation of life was only produced in those animals when they of themselves drank the water; and, as the deprivation of aliment was not in general attended with thirst, they never consumed a quantity of water equal to their daily loss of weight. If they were forced to swallow a quantity of water equal to their daily loss of weight, far from their lives being prolonged, they were considerably shortened; the animal died within a shortertime than if it had been deprived both of food and drink, and in consequence its absolute loss of weight was not so much at its death as if it had died of total inanition. For this fact, M. Chossat attempts to account, by supposing that the aqueous fluid dilutes the blood too much, and leads to the effusion of serous fluid in all the cavities and over the body. This was one of the morbid states attendant on this mode of death, and he thinks that this is the mode in which we are to explain those serous effusions so prevalent in those who have been treated by large watery diets, or by the hydropathic treatment much in vogue at present.

As it was ascertained that all the animals killed by starvation lost four-tenths of their weight, four-tenths of the natural substance of their bodies, it became a matter of importance to ascertain what organs of the body had been chiefly attacked to supply this loss. M. Chossat enters into long details on this point, comparing the weight of the different organs with those of the healthy animal, and thus arriving at an approximative conclusion. The fat, as might have been expected, first disappears, but as this is not one of the essential organs of the body, no attention need be paid to this. It is the muscular system which bears almost the whole loss. The heart is liable to be rapidly attacked, and conversely, experiences, under the effect of abstinence, a very great loss of weight. Its state might always be judged of from that of the muscles, and their state might be judged of from the appearance of the heart.

These researches of M. Chossat prove that this softened state of the muscular system, far from depending on an inflammatory state, as is generally supposed at the present day, results, as he has so beautifully shown from the agencies of life having attacked it, to supply the want of fuel to the respiratory function. These observations of M. Chossat also throw light on a fact never hitherto explained. In the process of training animals it has been a constant remark, that the treatment to which they are subjected

causes a marked enlargement of the muscular structure of the heart. Now, if M. Chossat's experiments prove that, when an animal is starved, the muscular structures of the body are those which chiefly conduce to supply the wastes of the system, and that the condition of the external muscles indicates that of the heart, we are warranted to conclude, that the condition of the muscular structure of the heart will increase with that of the muscles under training, and the one observation serves to illustrate and explain the other.

The only other important pathological appearance which it is necessary to notice, was, that the nervous system appeared to have lost none of its original volume or weight, though every other organ of the body was reduced both in volume and weight.

M. Chossat then endeavours to ascertain the influence of inanition on the animal heat, and, as a means of comparison, begins by studying that of the animal when under its ordinary food. His experiments on this point led him to discover, that, contrary to the generally received opinion, the temperature of warm-blooded animals is subject to a regular diurnal variation. He ascertained that the animal temperature regularly rises during the day, and falls again during the night, and this independent of the temperature of the air or of the season. This diurnal oscillation corresponds strictly with the force, and depth, and frequency of the respiratory movements. They are more numerous and forcible during the day, while the animal heat is highest, and slower during the night, during which period the temperature is lowest. More carbonic acid is consequently thrown off during the day than during the night. These facts serve to explain the reason why warmer coverings are required during the hours of repose than during our waking hours.

This diurnal oscillation of the animal temperature, which is just perceptible during the ordinary condition of all animals, becomes very marked when the animal is subjected to starvation. In the animal in its ordinary state, the diurnal variation, on an average, amounts only to 0°.74 of a degree of the Centigrade scale; but under complete inanition it mounts to a difference of 3°.28 of the Centigrade scale. The hours of mid-day and midnight are the periods of maximum and minimum temperature. When the animal, instead of being totally deprived of all food, is allowed an insufficient quantity, a kind of reaction often establishes itself, and the animal temperature rises above its normal state. It speedily, however, falls again, and follows the same laws as the animal under total inanition.

The general symptoms which attend starvation are the following. The animals remain calm from the beginning of the experiment till the half of the period which they live, or nearly the whole period is expired. After this they become more or less agitated, and this state lasts so long as the animal heat keep sto-

lerably high. The last day of their life the state of agitation ceases, and they fall into a state of stupor. If the animal be then left at liberty, it looks around it with an astonished air, without seeking to escape; sometimes it closes the eyes as if asleep. This state of stupor is attended with a rapidly increasing weakness. It shakes when it stands, and seems giddy; the feet are cold and livid, and contracted like a ball, and scarcely permit of the animal standing solid on them. It then becomes unable to stand without support, or, if a bird, rests on its belly and wings, soon after, it falls on its side and lies immoveable in any position it may fall into, and makes no efforts to rise. The respiration becomes more and more feeble and slow, the sensibility diminishes, the pupil of the eye dilates, and the animal dies, sometimes tranquilly, sometimes after a few spasms, or convulsive movements of the wings, or opisthotonos of the body.

M. Chossat comments in detail on the effects of inanition on all the varied functions of the body, beginning by that of the animal heat, whose phenomena furnish the key to all the rest.

In animals which are starved, the animal temperature, on an average, falls 0°.36 Centigrade daily; but the last day of life the loss of temperature takes place with such rapidity, that even 14° Centigrade of temperature may be lost, and death occurs in the warm-blooded animals when the temperature falls so low as 24°·9 Centigrade, or 76°·81 Fahrenheit,—a death attended with all the symptoms of that by cold. This is the temperature at which animals die which are plunged in refrigerant mixtures; it is therefore reasonable to infer that the cessation of life in starved animals is the consequence of the cooling of the body below what is sufficient for the purposes of life,—a cooling which results from the gradual diminution of the production of animal heat. As most of the animals died during the night, it seemed natural to conclude that the sudden fall of temperature the last day of life was simply the effect of the gradually increasing maximal nocturnal fall of temperature, for, as the inanition went on, the animal temperature lowered more and more every night, and lasted for a longer time than at first, and less reaction was noticed during the following day.

Under the influence of inanition, the respirations experienced a marked diminution in frequency,—a change which was more especially noticed as the cooling took place. As far as the function itself was concerned, it seemed to cease for some hours before death, (though slight respiratory movements took place;) such at least might be inferred from the fact, that the weight of the body scarcely diminished in weight during these hours.

The feculent discharges merit notice. They were copious the first day, because they contained the remains of the food taken the previous day, but were small in quantity afterwards. During the three last days of life, however, they augmented in

quantity, and presented the appearance of colliquative diarrhœa. The weight of these feculent discharges was intimately connected with the diurnal loss of weight; and, with the exception of the age, nothing appeared to possess a greater influence on the probable duration of life than the nature and quantity of this discharge; the duration of life and the quantity evacuated were always in the inverse ratio of one another.

The cerebral functions seem to remain entire till towards the end of life; the locomotive powers gradually become weakened, as above explained.

As M. Chossat's experiments led him to conclude that death eventually took place by the cooling of the body below what was requisite for the maintenance of life, he next endeavoured to ascertain whether life could be prolonged; and also whether an animal, which was just on the point of expiring, could be brought back to life and strength, if it were plunged into an elevated temperature. Experiments satisfactorily proved that both of these could be done. When animals, which were on the point of death from starvation were introduced into a heated stove, they revived little by little, and, by continued exposure to the elevated temperature, gradually recovered the use of their faculties. During this artificial state of existence, all the functions seemed to be executed much as in their natural state. The appetite returned, but digestion did not take place unless the temperature was kept up at its elevated point. It was difficult by artificial means to restore completely to the body the caloric it had lost, by the animal being allowed to be at the point of death from starvation. The heat acquired by this means varied with the temperature to which it was exposed. But what the heating could not restore was effected by the powers of the system as digestion went on; and during digestion the heat of the system returned.

These experiments are believed to prove in the most satisfactory manner both the use and the destination of food, and to show that its object is essentially to maintain the animal temperature. By inanition being pushed to its extreme point, the whole of the materials which can serve to supply caloric, by union with oxygen, are exhausted, and the animal dies from its body cooling below that point at which life can be maintained. Even at this last stage, however, if a portion of food of easy digestion, and such a degree of heat be given, as shall enable the animal powers to digest the food given, be artificially maintained, the animal temperature is restored, and death is prevented from ensuing.

It cannot escape observation, nevertheless, that to ascertain the utility of food scarcely required a series of experiments so elaborate. Any person of common observation knows that the great use of food is to supply the constant waste to which the system is incessantly exposed.

ART. III.—*A Practical Treatise on Organic Diseases of the Uterus.* By JOHN C. W. LEVER. M. D., Member of the Royal College of Physicians, London, Assistant Accoucheur Guy's Hospital, &c. 8vo. London, 1843. Pp. 240.

THE work of Dr Lever, we are informed, is the essay to which the Medical Society of London awarded the Fothergillian Gold Medal for year 1843, and the amount of information contained in that essay, and the mode in which that information is arranged, fully justifies the society in the selection they made.

Little more than twenty years have elapsed since our knowledge of the organic diseases of the uterus began to attain something approaching scientific accuracy, and even the little then known we owe almost entirely to the able writings of Sir Charles Mansfield Clarke.* Before his time many of the diseases of the uterus were confounded with those of the adjoining organs, or of the mucous surface of the vagina, and from the imperfections in the modes of examination, and want of knowledge of the pathology of these parts, the treatment was conducted by most empirical and antiquated rules. The appearance of Sir Charles Mansfield Clarke's work, particularly that of the second part in 1821, formed the commencement of a new era in obstetrical medicine, and, by directing the attention of the practitioner to the morbid states of the uterus, on which very many of the vaginal discharges depended, laid the foundation for that extensive and precise information on this branch of pathology which we at this day possess.

Strange as it may appear, our continental brethren appear to have taken up this branch of the science, and prosecuted it with much greater zeal since that time than had been done till very lately in this country; and the writings of their pathologists and accoucheurs contain an immense mass of useful practical information. Perhaps none contributed more to collect this information, and present it in a tangible form, besides adding most largely to its store, than the celebrated Madame Boivin, who with the joint aid of Professor Dugés, published in 1833 a work which still forms the standard of our information on the diseases of the uterus and its appendages. Our information on these diseases has rapidly accumulated since then, and it may with some probability be affirmed that our own country has again taken the lead in this branch, and the works and various papers of Clarke, Merriman, Lee, Ingleby, Ramsbotham, Ashwell, and several others may be adduced as examples. Our continental brethren have, however,

* Observations on those Diseases of Females which are attended by Discharges. Part 1. published in 1820. and Part 2, published in 1821.

been far from idle, and the consequence has been that the amount of our knowledge is now so precise that the diagnosis, nature, and treatment of diseases of the uterus and its appendages are to the full as perfect as any other branch of the healing art.

But as our knowledge of uterine diseases has become more extensive, physicians have begun to theorize on the subject; and while one very extensive class attribute some of the uterine affections, as for instance ulceration of the lips or neck of the uterus, to a primary cause, and reckons the presence of that affection as the cause of all the other morbid phenomena, another and a much smaller class are inclined, with Gosselin, to regard the ulcerations as a secondary formation, simply symptomatic of the diseased action previously existing and still going on within the body of the uterus. Such difference of opinion maintained by men of eminence and experience, cannot fail to prove of service to the profession, as it tends to direct the attention of all observers more especially to that point, and thus proves the means of amassing a quantity of facts and observations which will eventually elicit the truth.

The work of Dr Lever is divided into three parts,—the first treating of inflammation of the uterus,—the second of specific diseases of the uterus,—and the third of malignant diseases of that organ. Previous to entering on the consideration of these, a number of curious and useful introductory remarks are appended, which could not properly come under any of the above heads, as to the relative proportion of functional to organic diseases of the uterus; whether married or unmarried females are most liable to structural disease; whether the diathesis accompanying or predisposing to organic disease impairs the faculty of conception; and lastly, whether, if conception takes place, the organic disease interferes with the vitality of the offspring.

As to the relative proportion of functional to organic diseases of the uterus, Dr Lever, in addition to stating the result of his own extensive experience, quotes the observations of others, from which it appears that, in those affected with uterine complaints, about 65.3 of the 100 labour under functional disorders, whilst 34.7 suffer from organic disease.

In considering the query as to the proportionate liability of the unmarried to the married to structural disease, the author considers simply the cases which have come under his own notice, and finds that, of 95 females who were affected with polypus carcinoma, fungoid disease, and hard tumour, 89 were married, and 6 only were single. Thus apparently showing that marriage tended to favour the development of structural change.

From the author's own observations it would appear that the diathesis accompanying organic disease does not impair the facul-

ty of conception, for, of the 89 married women above referred to, 8 only had never conceived, and it is known, from the statistical tables kept in various countries, that 5 per cent. of married women are wholly unprolific. The same result was arrived at from some investigations the author made on this subject in those affected with *carcinoma uteri.* He found that the presence of that disease did not appear to interfere with the faculty of conception.

The last of his queries, as to whether the organic disease interferes with the vitality of the offspring, supposing conception takes place, is also, from his own experience, answered in the negative. Eighty-one women labouring under organic uterine disease conceived 553 times; 43 conceptions, or 7.7 per cent. terminated in abortion, and 510 children, or 92.3 children were born at the full time. Of these 510 children 12 only, or 2.35 per cent. were still-born. Subsequently he witnessed three other cases in which the infants were still-born, in all of which the mother laboured under encephaloid cancer. In these cases, the death of the child was clearly traced to the protracted labour, and consequent pressure on the head, in consequence of the non-dilatability of the parts through which the child had to pass.

The simple, yet satisfactory method adopted by the author for answering all these queries, is well worthy of imitation, as being the one best suited for arriving at just conclusions. Attached to a large hospital, where the number of cases of diseased uterus presenting themselves is very great, it is far more satisfactory thus simply to answer each query by detailing the results, as observed by himself, than endeavour to draw any general conclusions from the detached observations scattered through the works of various writers, in which, after all, many of the facts required to be known may not be specially noticed.

A few very sensible remarks on the different methods of examination are appended, and are treated of under four heads, viz., those of touch, vision, smell, and hearing. These are succinctly stated, and, as detailing the author's extensive experience, acquired in a large public hospital, are well worth the perusal of those who devote their time to this branch of the medical profession.

The author prefaces his particular description of the uterine diseases by giving a summary of the general symptoms which characterize the presence of organic disease. These consist of the vaginal mucous secretion becoming more copious, often being attended with hemorrhage, and gradually passing into a purulent, greenish, and watery, or sanious discharge, which either irritates the parts over which it passes, or excites no particular action, and is or is not attended with fœtor. Dragging sensations and lancinating pains begin to be experienced in the pelvic region, and extend to the loins and thighs. These may be constant or only re-

cur periodically or on excitement or exertion. As the uterine disease advances micturition and defecation become painful; the abdomen swells; febrile symptoms manifest themselves; the patient becomes emaciated and feeble; the face becomes sallow, or has a peculiar yellow tinge; vomiting generally comes on; the strength becomes prostrated; diarrhœa sets in, and the patient gradually sinks from exhaustion.

The first part of Dr Lever's work, that on inflammation of the uterus, is divided into two sections, the first treating of acute, the second of chronic inflammation of that organ.

Acute inflammation may occur in the unimpregnated or in the impregnated uterus, and is attended with symptoms somewhat different in each case. In the unimpregnated uterus, acute inflammation is by no means of frequent occurrence, but may occur in two situations, either in the body of the organ, or in the lining membrane. It rarely occurs before puberty, and all the author's cases occurred in females under the age of thirty-five.

In his practice, the common exciting cause was suppressed menstruation, or the use of strong astringent injections, used for the cure of leucorrhœa. He has never traced any case to local contusion, supposed to be the most common cause by Lee, Waller, and others.

Acute inflammation of the unimpregnated uterus is generally ushered in by rigors, followed by febrile excitement. Heat and pain in the pelvic region, darting into the back through the *symphysis pubis*, and down to the groin and thigh. If this occur during a menstrual period the catamenia disappear, and, if leucorrhœa has been present, that discharge stops suddenly, and the vagina feels hot and dry. The pain is increased by pressure on the lower part of the abdomen. The pulse is quick, hard, and sharp, the skin hot and dry, there is frequent desire to micturate, and pain attending the urinary evacuation as well as that of the fæces. The mammæ sympathize and become swollen and painful; the stomach is irritable; nausea and vomiting are frequently present, and there is great thirst. The uterus on examination appears increased in weight and size, is frequently prolapsed, very painful on pressure; the *os uteri* is frequently patulous, and directed towards the back of the pelvis.

This disease may be confounded with inflammation of the bladder or of the rectum, but a minute examination of the symptoms will prevent falling into this error. The pain, heat, and tenderness on pressure, serve to distinguish it from scirrhus, and the absence of ulceration and of other symptoms prevent its being confounded with carcinoma.

Inflammation of the unimpregnated uterus is but rarely fatal; the author has only met with three such cases. The most fre-

quent termination is by resolution, but the inflammation also occasionally terminates in softening, abscess, or gangrene.

The treatment consists in the general abstraction of blood, if the patient be able to bear it and the attack be very severe, but in other cases cupping the loins, and applying leeches to the vulva, anus, or *os uteri*, are preferable. Some consider it preferable to scarify the *os uteri*, which is easily accomplished in the manner recommended by the late Mr Fenner of Pentonville. The hip-bath, tepid anodyne injections, bringing the system under the influence of mercury, and keeping the bowels open by means of neutral salts with antimony, are the chief of the auxiliary means.

Three interesting cases are detailed illustrative of this form of malady, two of them apparently selected on account of their terminating fatally, and allowing the state of the parts to be examined after death. In both an abscess was found in the uterine walls.

Hysteritis, or acute inflammation of the impregnated uterus, most frequently occurs after delivery, but may make its appearance at any period of pregnancy. The inflammation may either attack the whole uterus, or, as is more common, only a small portion. The most frequent seat is the site of the placenta, terminating in morbid adhesions of that body. It sometimes occurs in the cervix, leading to softening of the tissue. Cold, injuries, and attempts at premature labour are the common causes of the complaint.

The symptoms which indicate this complaint are constant severe pain in some part of the abdominal tumour, increased on pressure or on the movements of the child, not relieved by assuming the recumbent position or unlacing the stays. If the inflamed portion be on the lower part of the organ or on the cervix, there is frequently tenesmus, and a constant desire to micturate. More or less febrile symptoms are present, as headach, thirst, occasionally vomiting, dry-skin, loss of appetite, &c.

This form of inflammation has various terminations. In some cases, it terminates in resolution ; in others, fibrinous matter is effused, and glues the placenta to the uterus, either in whole or in part. Partial adhesions, indeed, are very common. Softening is a dangerous sequence both for mother and child, as it frequently leads to rupture of the organ during parturition. Such cases are not uncommon, and one additional one is related by the author. This form of inflammation also occasionally terminates in abscess, of which a very beautiful example is related by Dr Lever, in which the abscess formed in the neck of the uterus and burst into the vagina. The patient retained her child for some time, but premature labour afterwards came on, and she was delivered of a dead and putrid fœtus. The termination in gangrene is of extreme rarity.

In the treatment of this form of inflammation, it is very rarely requisite to have recourse to blood-letting, the disease generally occurring in highly irritable women, who could not bear the loss of blood. Leeches, followed by a warm cataplasm, are, in general, all that is required in the way of depletion. Blisters are often highly useful, and the author thinks it more advisable to re-apply them than to keep them open. Calomel given so as to affect the gums, the hip-bath, and anodyne enemata, are useful adjuvants.

When this form of inflammation comes on after delivery, it generally commences from the second to the fifth day of delivery, and is ushered in by rigors, which are followed by considerable febrile reaction. Pain at the lower part of the abdomen, increased on pressure, is complained of. This pain is constant, but is aggravated in paroxysms. The uterus is found enlarged and tender on pressure. The abdomen generally is neither swollen nor tender, but if the peritoneal membrane becomes involved these symptoms rapidly become developed. The pain is usually aggravated by applying the child to the breast, and extends to the groin, loins, and thighs. Sickness and vomiting, with intense headach, often attend the disease. The pulse is quick and soft, but if the peritoneum be involved it is sharp and wiry.

The disease may terminate in a profuse offensive lochial discharge, in a flow of blood from the uterus, or in copious perspirations; but if it continues the patient rapidly sinks under the increased pain and vomiting. In the fatal cases the uterus is found enlarged, œdematous, or doughy; its colour is altered to green, grey, blue, or red. It is frequently covered with a viscid purulent deposit or by false membranes, while flaky serum is found in the abdominal cavity. Purulent matter is often met with in the parenchyma of the organ, either diffused through it, or collected in two or more places. This matter is also occasionally found in the uterine veins.

In this form of the complaint blood ought to be drawn till a decided impression be made on the disease; but if she cannot bear the general loss of blood, twenty or thirty leeches ought to be applied over the uterine region, and be followed by cataplasms of linseed, conium, or of bran. The author has never found any good result from the administration of mercury; and though it is proper to evacuate the bowels by means of gentle laxatives, drastic purgatives are to be avoided, as they invariably increase the patient's sufferings. Much benefit has been derived from the exhibition of diaphoretics of antimony with Dover's powder.

It frequently happens that women who have suffered from hysterics do not again become pregnant, probably from the closing of the Fallopian tubes. The author details three cases as examples of this form of inflammation. One of these being a fatal abscess, the

morbid appearances resembled those above described, as peculiar to this affection.

Chronic inflammation of the uterus after delivery sometimes remains after the more violent symptoms of acute inflammation have subsided. Dr Lever has, however, occasionally met with it as a distinct attack from the first, usually supervening on the improper administration of the ergot of rye. In such cases, pains in the pelvic region, increased on assuming the erect posture, and on defecation and micturition are experienced; tenderness is felt above the pubes, and there is a thick white discharge occasionally streaked with blood. The skin is hot, alternating with chills, the pulse small and quick; the tongue coated; the urine scanty and high-coloured; thirst; and loss of appetite. On examination the uterus is found enlarged, the lips tumid and tender, and the cervix very painful on pressure.

The author is of opinion that patients who have thus suffered are not prone to conceive; and that, not unfrequently, the changes produced in the structure serve as a nidus for the deposition and subsequent development of malignant disease.

The plan of treatment found most beneficial consists in detracting blood locally by means of leeches to the *os uteri*, or by cupping or leeching the loins, together with anodyne injections of conium or poppy. Gentle or alterative laxatives are also of use, and when the febrile symptoms have abated mild bitter infusions and generous diet prove serviceable. The use of the tepid salt water bath, and a residence at the sea side, hasten recovery after the active symptoms have subsided. The author gives the details of two illustrative cases of this form of disease with the treatment employed for each.

Chronic inflammation of the unimpregnated uterus affects either the whole organ, or is confined to the *os* and *cervix uteri*. A dull pain is experienced in the lower part of the abdomen, with a sense of weight or dragging pain in the loins. The pulse is excitable, but soft, and not much quicker than natural. There are frequently vomiting and loss of appetite. The mammæ sympathize, becoming painful and tumid, especially at the menstrual periods. The catamenia are in some suppressed, in others more abundant than usual, and occasionally mixed with coagula or shreds of membrane. Between the menstrual periods there is usually a cream-coloured discharge, varying somewhat in density and appearance. On examination, the uterus is found increased in volume; the neck is swollen; and there is increased heat of the parts.

When the inflammation is confined to the os and cervix, there is frequent desire to evacuate the bladder and pass the feces, and the pains felt in the pelvic region and groin are increased whenever the abdominal or lumbar muscles are used. It is also greatly

increased on sexual intercourse. The symptoms are increased at the menstrual period, the discharge at which time is generally scanty and attended with difficulty and pain. At other periods, an opaque discharge resembling thin cream occurs, which easily washes from the finger and diffuses through the water. Vaginal examination detects the os and cervix to be swollen and exceedingly tender on pressure, and the seat of increased heat.

The great pain, heat, and tenderness, on pressure, with the general symptoms, serve to distinguish this disease from scirrhus, and the absence of ulceration from carcinoma. The internal examination serves to distinguish it from affection of the bladder or rectum. This complaint may terminate in hypertrophy, induration, simple ulceration, or enlargement of the glands. The common causes of the complaint are cold, excessive indulgence in sexual intercourse, mechanical irritation, and exhibition of the ergot of rye. The author believes, that the irritating nature of the male seminal fluid is also a frequent cause of chronic inflammation of the body and neck of the uterus.

The treatment is simple, and, if had recourse to before any alteration of structure has taken place, is generally successful. It consists of rest, strict abstinence from sexual intercourse, cupping or leeching the loins, applying leeches to the *cervix* and *os uteri,* or scarifying the *os uteri,*—operations which generally require to be repeated more than once. These means are considerably aided by the use of the hip-bath, the exhibition of mild laxatives of the neutral salts, the nightly exhibition of sedatives, as of hyoscyamus or Dover's powder, or even an opiate injection, and the employment of vaginal injections of decoctions of conium or of poppy, or a weak solution of acetate of lead, or the decoction of poppy with alum. The diet ought to be light, everything stimulating being avoided till all the symptoms become ameliorated.

Each of the sequelæ of chronic inflammation requires particular treatment. Thus hypertrophy is most successfully treated by repeated leeching and the internal exhibition of mercury, either alone or combined with iodine. The protiodide of mercury is a most efficacious remedy, and seems to combine the good properties of both. The patient's strength must be supported by nutritious diet of a mild unirritating character, and, occasionally, the mild bitter infusions are useful.

Engorgement, or a varicose dilated state of the uterine vessels, requires occasional leeching, vaginal astringent injections, tonics internally, sea-bathing, and nutritious diet.

Induration, the result of chronic inflammation, must be carefully distinguished from malignant disease. The preceding creamy discharge and the regular smooth condition of the uterus, serve to diagnose it. In malignant disease the uterus is generally nodulated. Depletion is seldom requisite unless some degree of in-

flammation be still present. Mercury, either alone or combined with iodine, is the indispensable and most useful remedy, to which may be added, mild bitter infusions, decoction of sarsaparilla, and light unirritating diet. Two illustrative cases are given of this sequela of chronic inflammation.

Simple ulceration, as a sequela of chronic inflammation, is frequently overlooked, because, in most cases, the touch fails to detect it. The ulcer is often a mere abrasion, in others it is thin and shallow, not deeper than the mucous membrane, and sometimes bleeds on the slightest touch. This disease is generally preceded by symptoms of inflammation, fever, pains in the pelvic region, and sensation of dragging in the lumbar region, and of a weight in the anus, all of which are augmented at every menstrual period. The leucorrhœal discharge is usually yellow and streaked with blood. These ulcerations are to be distinguished from syphilitic ulcers by the want of the hard regular edges, and yellow sanious discharge, as well as by the moral character of the woman. Its limited and superficial extent, and slighter constitutional symptoms distinguish it from the corroding ulcer, while the want of hardness, the nature of the discharge and of the pain, distinguish it from malignant cancerous ulceration.

The treatment of simple ulceration consists in the employment of local depletion, and it is most serviceable when the leeches are applied directly to the *os* or *cervix uteri.* The hip-bath and emollient vaginal injections, with gentle laxatives, and the administration of opiates at bed-time, if required, suffice to reduce all inflammatory tendency; and when this is done the ulceration is to be healed up by the local application of lunar caustic, and by the improvement of the general health.

When the ulcerations are situated on an uterus in a state of procidentia, if much inflammation be present, two or three leeches may be applied, and the part then poulticed with white wash or poppy poultice. If the ulcers are indolent, with hardened edges, a bread poultice with black wash and extract of opium, often renders them healthy, and if the parts be then returned, they rapidly heal. If the granulations become spongy, the nitrate of silver, or sulphate of copper, are the best local applications.

The last sequela of chronic inflammation is enlargement of the glands of the *os* and *cervix uteri.* This affection is often attended with an intolerable pruritus, and slight leucorrhœal discharge. Nothing can be detected by examination, but the finger is often stained with blood; and when the speculum is used, small white and soft granules, seemingly vesicular, are seen in great numbers on the *os uteri.* If local tenderness or inflammation be present, local depletion is of great service. If tenderness be wanting, injections of sulphate of iron, or of nitrate of silver, serve to remove the complaint.

The second part of the author's treatise is devoted to what the author terms specific diseases, under which he somewhat strangely includes all polypous and other tumours, which do not possess malignity, besides those diseases which are generally termed specific, viz. struma and syphilis.

The author distinguishes three varieties of polypus, the fibrous, the cellular, and the glandular. These grow from any part of the *os*, *cervix*, or body of the uterus, and though generally with narrow necks or stalks, have occasionally broad attachments, or even two or more of these stalks. These tumours are more common in unmarried than in married women, in the author's practice, in the proportion of seven to three.

Hæmorrhage is often the first symptom of the presence of polypus, at first perhaps only appearing as increased menstrual discharge or as coagula attending it. The attacks of hæmorrhage, however, appear irregularly, and as the tumour increases in size, the amount of blood lost is greater. Sometimes, instead of hæmorrhage, there is a fetid purulent discharge. The constant loss of blood or discharge soon reduces the patient, and produces palpitation, emaciation, œdema, &c. A feeling of weight and bearing down in the pelvis, with tenesmus and difficult micturition, also pretty constantly attend. The author mentions that he has remarked that about a half of the uterine polypi he met with were sensible, so that the want of sensibility does not serve as a diagnostic mark of the disease. From pregnancy in the earlier months, polypus is with some difficulty distinguished, so long as it is confined within the body of the uterus, but the menses are generally suppressed in pregnancy, and then the dragging weighty sensation is not experienced.

Procidentia and *inversio uteri*, scirrhous enlargment of the *os uteri*, the cauliflower excrescence, the fungoid polypoid growths, which occasionally attend cancer, and even encysted and other tumours of the vagina, have been mistaken for polypus.

The treatment of polypus varies according as the tumour can be reached or not. If the tumour be confined within the uterus, and its os be closed, the whole aim must be directed to arrest the fearful hæmorrhage, and cause the expulsion of the polypus beyond the os. Astringent medicines and injections, the exhibition of the ergot of rye, and plugging the vagina, together with the use of nutritious food, is almost all that can be done. When the tumour, either by these means or naturally, comes within reach it must be removed by operation, either by torsion, by ligature, by excision, or by the actual cautery. Very good directions are given by Dr Lever as to the mode in which each of these different operations should be performed and the cautions they severally require in their employment, and a few interesting cases are detailed in illustration of the symptoms, and modes of removal of *polypus uteri*.

Under the title of hard fleshy or fibrous tumours of the uterus the author includes those which are in general not pedunculated, which are either not malignant, or if so in a very low degree.

These tumours vary much in consistence and structure, being in one case of a fleshy structure resembling that of the uterus itself, in others consisting of tough, filamentous laminæ, arranged in concentric layers, or interspersed with cavities containing fluids of different densities, or the tumour becomes changed into a cartilaginous substance, in which calcareous deposit occurs, or the tumour appears to be composed of a number of smaller masses. They occur of all sizes from that of a pear to that of the prégnant womb. They are mostly found imbedded in the cellular tissue beneath the peritoneal membrane, occasionally between the layers of the proper tissue of the organ, and most rarely beneath the mucous lining. In the latter situation it mostly gives rise to alarming hæmorrhage.

The symptoms attending the formation of these tumours are by no means prominent, sometimes they excite so little inconvenience that it is only their size which causes the attention to be directed towards them. If the tumour be seated in front of the uterus it presses on the bladder, exciting increased desire to pass water, with difficulty in voiding it; if, on the posterior part of the uterus, it presses on the rectum, giving rise to tenesmus, hæmorrhoids, &c. If the tumour be seated on either side it usually causes numbness and cramp of the corresponding extremity. The tumour itself causes dragging, bearing down, or aching in the loins or pelvic region. These tumours are more common in unmarried and sterile women, than in those who have borne children.

The diagnosis of these tumours is sometimes difficult, as they may in certain cases be mistaken for pregnancy, congestion and induration of the uterus, scirrhus, polypus, ovarian disease, or even for abdominal tumours. The author lays down at length the various symptoms by which fibrous tumours may be distinguished from any of these.

The author is inclined to believe that, if these tumours be not interfered with, they do not in any marked degree abbreviate the duration of life; but if from a blow or the effects of pregnancy, inflammation be excited in them, they generally terminate fatally. In some instances life is destroyed from the tumour preventing the evacuation of the bowels or discharge of the urine.

As to treatment, therefore, Dr Lever thinks, that, "if the tumour be small, and if it do not impede any function, the best treatment is not to interfere with it;" and he has known cases where the attempt to interfere has only weakened the patient's

strength, and tended to rouse the morbid action to activity. Palliative measures are therefore alone recommended, as attending to the state of the bowels, and of the general health, and doing what we can to obviate the inconveniences which arise from the mechanical pressure of the tumour as it increases. Sir Charles Clarke has seen cases in which the tumours were absorbed spontaneously; and Dr Ashwell says he has derived service from the use of iodine, and even seen those situated on the os and cervix removed by such means. Dr Lever has, however, never seen such success follow, but he holds out for our encouragement the fact, that he has witnessed a tumour which was rapidly increasing cease to grow larger on bringing the system under the influence of iodine, combined with cupping or leeching the loins or vulva. If the tumour, however, should be connected to the uterus by a narrow base, and project through the os, it may be removed by ligature as an ordinary polypus.

The author subjoins some excellent remarks on the hard or fibrous tumours as associated with pregnancy, for though, generally speaking, women suffering from these tumours are sterile, they do occasionally become pregnant. In some cases the patients recover as if no tumour were there, and experience no uneasiness either during pregnancy or after parturition. In other cases, however, increased action takes place in the tumour, symptoms of constitutional irritation come on, and abortion, deformity of the fœtus, or monstrosity may result. In other cases the women bear their children at the full period, but softening and disintegration of the tumour take place after delivery, rapidly bringing on a fatal result. In other cases the patients die from uncontrollable hæmorrhage after delivery.

These tumours are often so situated as to prevent the birth of the child; in such cases they have been removed by excision, but if they are within the cavity of the uterus this cannot be done. The author, therefore, counsels that, if the unaided efforts of nature cannot serve to overcome the obstacle, the child must be sacrificed and removed piece-meal. In this case the labour must not be allowed to proceed too long before such assistance is given, as the compression to which the tumour is subjected may so bruise it, and lead to suffocation and gangrene. If a person affected with a fibrous tumour in such a situation as to impede labour should become pregnant, it may become a question whether premature labour ought not to be induced.

Strumous tumours of the uterus appear to be very rare, and seldom come under the notice of the practitioner as a separate disease. When they are recognized they demand the same treatment as when they occur in other parts of the body.

The diseases resulting from impure sexual congress, the author

dismisses very summarily, the black wash and nitrate of silver being the local applications; while Plummer's pill, iodide of potassium, sarsaparilla, and nitric acid constitute the internal remedies.

The third part of Dr Lever's work treats of Malignant Diseases of the Uterus, under which are included cauliflower excrescence, corroding ulcer, melanosis, and cancer.

The cauliflower excrescence, Dr Lever regards as very rare, having only met with three cases of it, while he has met with 350 cases of cancer uteri. It consists of a highly vascular tumour of a flesh colour, with a granulated surface, covered with a fine membrane, which secretes a copious watery fluid. After death the tumour almost disappears, leaving nothing but a mass of flocculi apparently consisting of empty vessels. It is in most cases attached to the *os uteri*, occasionally, however, it fills the uterine cavity. If it be removed by ligature it rapidly forms again. The causes of this production do not appear to be known.

This form of tumour is known from the copious watery discharge soon streaked with blood, and rapidly thereafter by the frequent severe hæmorrhage. Sexual intercourse, the expulsion of hardened feces, or a digital examination, bring on the bleeding, but no pain is in general complained of, the tumour being apparently insensible. The continued discharge soon affects the general health, giving rise to the blanched countenance, hollow dark eye, palpitation, loss of appetite, general œdema, &c. characteristic of malignant disease.

The tumour requires to be distinguished from placental presentation, the fungoid growths of cancer, and pedunculated tumours, with which a hasty examination might be apt to confound it. The prognosis is always unfavourable. The patient may die suddenly from the hæmorrhage, or more slowly from serous effusions into some of the cavities, or may sink exhausted from diarrhœa.

The treatment consists, firstly, in the use of astringent injections to diminish the discharge, lessen the size of the tumour, and contract the vaginal walls; or, if this treatment do not succeed, by removing the tumour by means of ligature, and endeavour to prevent its re-formation by means of nitrate of silver or other caustics applied to the spot from which the tumour grew. The strength must be carefully supported by bland but unstimulating nourishment, with simple tonic or bitter infusions. Women labouring under this tumour occasionally become pregnant, but rarely carry the child to the full period, or, if they do, are very liable to fall victims to hæmorrhage following the delivery.

Corroding ulcer of the uterus consists in a malignant ulceration of its mouth and neck, the remaining portion of the organ being scarcely at all enlarged. When examined after death it is found

that a greater or lesser portion is removed by ulceration, which extends itself in a circular manner, so as completely to destroy the cervix and part of the body. Sometimes the anterior or posterior part of the organ is attacked, and the ulceration spreads from thence to the bladder or rectum. The peculiarity of this disease is, that no new morbid matter is ever deposited either in the uterus itself, or in the neighbouring parts. Dr Lever considers that the disease has its origin in the glandular structures around the neck of the uterus; and is most frequently found to occur about the period of the cessation of the menses.

Occasional pain or uneasiness in the pelvis, a sensation of heat, and leucorrhœa, with slight hæmorrhage at intervals, the discharge becoming ichorous and fetid, are the usual symptoms which mark the presence of this ulceration. The patient becomes emaciated, the skin dry and sallow, there is considerable fever, with loss of appetite, the features become sharpened, the eyes sunk, and surrounded with a dark circle, &c. The disease generally terminates by exhausting the powers of life, or by exciting diarrhœa, or inflammation of the peritoneal membrane. In almost every instance the disease terminates fatally. The absence of new deposit characterizes it from ulcerated carcinoma, and the nature of the discharge, the pain, and corroding character of the ulcer, distinguish it from simple ulceration.

If the disease be recognized before ulceration has commenced, the author recommends to abstract blood locally, or from the loins, to use the hip bath, and laxatives; but if ulceration has made its appearance, to apply the nitrate of silver, or cautery, and use injections of the nitrate of silver. If these fail to arrest the progress of the disease, sedatives must be had recourse to, and emollient or mucilaginous injections used to prevent the acrid discharge excoriating the parts. If, when first consulted, says Dr Lever, we are certain of the nature of the ulceration, and if there be a septum of healthy tissue between the disease and the body of the uterus, we should act wisely by excising the *os uteri*.

Dr Lever relates an interesting case where he met with melanosis of the uterus, and states that he has at present under his care another case in which he suspects a similar morbid deposit. These cases appeared to consist at first of the simple hard fibrous tumour, in which the melanotic deposit had subsequently taken place. This at least occurred in the case which he narrates, in which he had an opportunity of examining the morbid structure after death.

Under the head of carcinoma, or cancer of the uterus, the author includes the encephaloid, scirrhoid, and colloid forms of tumour. Almost from the very beginning of the disease it may be regarded as constitutional, and, though extirpated, returns and kills the patient. The carcinomatous degeneration destroys the tissues of the

part, whether they be muscles, nerves, tendons, or bones. It seems, however, not merely to involve and alter the natural structure of the part, but to consist of the development of the structures of carcinoma within and around them. Its development is usually accompanied with the firm adhesion of the parts in the neighbourhood, so that this growth is more fixed or less moveable than other growths.

The author first enters on the anatomical description of the three varieties of cancer,—the encephaloid variety, consisting of dense septa, crossing the mass, and dividing it into lobes or lobules,—the scirrhous variety, consisting of dense fibrous bands, deposited in lines crossing each other, or radiating from a central cartilaginons nucleus, and inclosing a gray, bluish, or whitish matter,—and the colloid variety, in which the whole surface is divided into a vast number of distinct alveoli, regularly arranged, and of an oval or oblong shape; the septa forming the walls of these being of a fibrous structure.

Dr Lever has never been able to meet with even a single case in which cancerous disease was communicated by infection. Cancer, therefore, does not seem to be capable of being so communicated. None of the husbands whose wives laboured under cancerous disease of the uterus were ever, so far as Dr Lever could ascertain, affected with that disease. He, however, in several cases, was able to trace its transmission by hereditary descent, and one series of cases came under his notice, in which three successive generations, grandmother, mother, and daughter, all fell victims to cancer. From the registers of the obstetric patients at Guy's Hospital, it would appear that the proportion of cases of cancer of the uterus to the other uterine diseases is as 1 to 7, or 13·5 per cent.

Females of the lymphatic temperament are stated to be especially liable to this disease; while depressing passions, mental anxiety, bad food, unhealthy situations, and exhausting occupations form the predisposing causes. The author has not been able to corroborate the statement that syphilis is a fruitful cause of the disease. On the other hand, he found prostitutes "not so prone to become the subjects of carcinoma." Others have stated that virgins are more liable to cancerous disease of the uterus; but Dr Lever's researches, founded on a pretty extensive experience in a public hospital, lead him to form an opposite opinion. In a paper which he published in the Transactions of the Royal Medico-Chirurgical Society for 1839, he stated that, in 120 cases of cancer of the uterus, the unmarried women bore a proportion of only 5·83 per cent., widows of 7·5 per cent., while the proportion of married women amounted to no less than 86·6 per cent. Since that period he has collected a great many additional cases of the

disease, and finds the result to be as there stated, viz. that the disease is very much more common in married women than in any other class. The period of life most obnoxious to cancer of the womb is at the cessation of the catamenia; and it appears to be most common in those who have laboured under dysmenorrhœa.

The necroscopic appearances observed in nineteen women who died of cancer of the uterus are described with considerable minuteness of detail. Eleven only of that number were emaciated. As scarcely two of these cases presented in their morbid appearances the same pathological alterations of structure, it seems unnecessary to enter into details on the subject in this place, for the particulars we beg to refer to Dr Lever's work itself. The diseased appearances observed in the varied organs of the body were not more numerous or greater than what might be expected in persons labouring under such a fatal and malignant disease. Two circumstances only appear worthy of notice,—the one, the frequency of effusion within the chest, apparently produced by acute or subacute inflammatory action, the other the general freedom from carcinomatous deposits over the body; exceptions of course occurred, and the diseased action had frequently involved the rectum, or bladder, or ovaries. The chief diseased appearances were of course found in the uterus, its cervix and os; and they exhibited all the varied changes from deposition of morbid matter to complete destruction by the ulcerative absorption. The ovaries, Fallopian tubes, ligaments, vagina, and pelvic cavity, pretty often participated in the general diseased action.

The observations on the cancerous affections of the uterus may be regarded as the most valuable in Dr Lever's work, and appear to be those to which he has devoted especial attention. Accordingly, after the very full description of the necroscopic appearances to which we have just alluded, the author describes with great minuteness of detail, the symptoms of cancer as they occur in its three different stages. 1. The incipient stage; 2. the stage of scirrhus; and 3. the stage of ulceration.

The symptoms attending the first stage are not very characteristic of malignant disease, being scarcely distinguishable from those of chronic inflammation of the uterus. Examination by the finger and by means of the speculum, however, discovers the edge of the *os* to be hardened, fissured, or irregular, while small projecting bodies like shot or gravel are felt under the mucous membrane. The *os* and *cervix* have a deep crimson hue, but the projecting points are bluish. When these granular bodies enlarge and give to the part an unequal knobbed feeling, they constitute the second or scirrhous stage, the symptoms attending which are more characteristic. The uterus falls down and produces a painful dragging sensation, with pain during the evacuation of the

bowels and frequent desire to pass water. The pains referred to the uterus are now more or less lancinating. There is considerable discharge from the lining membrane of the uterus, but it is neither fœtid nor acrimonious till ulceration commences. Blood, however, is frequently mixed with it, and there is occasionally œdema of the lower extremities. Examination detects the *os uteri* to be knobbed and irregular, without breach of surface. The mouth open, and the lips rigid. It feels softer at the spot where ulceration threatens to commence. The cervix is seen to be swollen, tense, and shining, and of a deep red or brownish colour.

In the third stage the pains are more severe, burning, gnawing, or lancinating, and are generally aggravated during the night. At times the pain occurs in paroxsyms once or oftener during the day, and lasting for one or two hours; they sometimes take the course of the sciatic or crural nerve, or may fix themselves in the foot, and never be referred to the pelvis. Hemorrhage very generally attends the ulcerative stage, and the discharge becomes fetid, of a dark-brown, dirty-white, green, or black colour, and is often tinged with blood. This discharge is acid, and often excoriates the labia and thighs. Dysuria comes on, and the urine is mixed with mucus. The whole constitution sympathizes; is marked by nocturnal perspirations, hectic fever, diarrhœa, &c. The skin becomes shrivelled, parchment-like and yellow; the muscles waste; the features shrink; the countenance has a sharp distressed appearance; the appetite fails; and aphthæ are often present. On examination, a hard, irregular, immovable mass fills the pelvis, about the centre of which may be detected the *os uteri*, more or less completely surrounded by ulceration, which often extends to the bladder or rectum. The ulceration is tender on pressure. The great pain caused by the introduction of the speculum almost interdicts the use of that instrument

As to the duration of the disease, Dr Lever, from 120 cases seen by himself, ascertained that the average duration was 20¼ months; the shortest period being 3 months, and the longest 66 months, from the invasion of the disease to the fatal termination.

The diagnosis of cancer of the uterus is of some importance, as it may be confounded with many other uterine affections. These are, irritable uterus, stone in the bladder, simple induration, fibrous and hard tumours, early pregnancy, moles, hydatids, simple ulceration of the *os* or *cervix*, the corroding ulcer, and syphilitic ulcers. But strict attention to the peculiar symptoms attendant on each of these serve to distinguish cancer from them. It is the first stage which is most liable to be confounded with other diseases, but especially with irritable uterus; but the absence of that requisite sensibility which characterizes that disease, and the presence of the granular shot-like bodies, serve to distinguish can-

cer. The lobulated hardness and fixedness of the uterus serve to distinguish cancer from the other diseases which might be mistaken for it when in its second stage; and the presence of morbid deposit, fixed tumour, and constitutional symptoms, distinguish it from those ulcerations which might be confounded with it when in its third or ulcerated stage.

As cancer of the uterus is not very frequently seen in its first stage; it is not often that treatment is of much use. When, however, it is recognized in its early stage, it seems to be amenable to treatment, and Dr Lever's experience seems to correspond with that of Dr Montgomery, that, if taken in this stage, the disease "may, in many instances, be turned aside, and the victim rescued from the sad fate impending over her;" and Dr Lever, in illustration of the plan of treatment which he recommends, relates one successful case of cure. If, however, the disease has gone on to the second stage "there is no hope of cure, and but little, if any, decided mitigation of the agonies endured by the patient."

The treatment in the first stage of cancer of the uterus Dr Lever recommends to consist in the frequent application of leeches to the mouth of the uterus, or as near as possible to that organ; and the employment of anodyne injections. Mercury ought then to be given in small doses till the system is brought under its action; or the mercury may be given in combination with iodine. When the system is once fairly mercurialized, iodine, iodide of potassium, iodine with iron, or, what Dr Lever much prefers, the preparations of arsenic, the *liquor potassæ arsenitis*, five to eight drops three times a day in a bitter infusion. Repeated blistering over the sacrum, or an issue over the sacrum, or either sacro-iliac synchondrosis is of much service. Everything stimulating must be avoided; and the diet ought to consist of the lightest and most easily digested articles of food.

In the treatment of the second stage Dr Lever directs the treatment to have three objects in view. To lessen congestion by the local depletion; to relieve mechanical pressure by position, attention to bowels, &c.; and to support the strength of the system, and relieve suffering by the combination of anodynes with tonics, and endeavour to promote absorption by the exhibition of iodine.

In the last stage, little or nothing can be done, but to support the patient's strength, and endeavour to alleviate her sufferings by the exhibition of narcotics internally, or by injections or suppositories. Dr Lever finds arsenic in this stage of considerable utility, as it both acts as a stomachic and narcotic. To lessen the discharges, various injections may be used, as acetate of lead, nitric acid, sulphates of alum, copper, zinc or iron, decoctions of carrots, oak bark, tormentilla, and to correct fœtor, chlorides of soda or of lime. If the evacuations of the urine be not attended to, it is apt to ac-

cumulate and give rise to stupor, which gradually merges into coma.

The author next proceeds to consider the two surgical operations which have been recommended for the removal of this disease—the one being the extirpation of the entire uterus, the other the removal of the *os uteri* alone. As several cases have been recorded of the successful extirpation of the uterus by the knife or by ligature, it has been proposed to remove it in cases of cancer. Nineteen cases of this operation have been published, but of these sixteen died. The operation can only be performed when the disease is strictly confined to the uterus, and where there is no organic disease in the neighbouring organs. Dr Lever quotes Dr Blundell's and M. Recamier's mode of operating,—the one pressing up the uterus, the other drawing it down within sight before commencing the operation. Many difficulties attend the operation, and the dangers are very formidable. The patient may die from the hæmorrhage, or from the shock given to the constitution, or, if she escape these, she may sink under peritoneal inflammation. But as there is no certainty that the whole disease is thus removed, and the operation is besides the greatest and most painful which the surgeon is called on to perform, Dr Lever recommends that it be not readily undertaken or on slight grounds.

Excision of the *os uteri*, though often performed on the continent, has been very generally condemned in this country, and Dr Lever seems to participate in this condemnation of it. He states that very few cases can be fit for this operation, as there ought to be a clear line of healthy tissues between the diseased portions and the body of the uterus. Patients, however, seldom apply till the disease has advanced beyond its early stage, and become rooted in the system, so that even though the diseased spot were removed, it would become redeveloped in the uterus or other organs. The operation itself is simple in its performance, consisting in drawing down the *os uteri* so as to bring it within sight, and then cutting it off; or introducing the speculum, fixing the os with forceps, and either removing it by instruments contrived for the purpose, or by means of a curved probe-pointed bistoury. Hæmorrhage is apt to cut off the patient, either immediately after the operation, or a short time thereafter; and hysteritis or peritonitis may be subsequently developed.

It seems not a little astonishing that cancer does not always destroy the power of conception; for several cases are on record in which pregnancy occurred when the uterus was in its several stages of cancerous degeneration. Abortion very frequently takes place in such cases. If the child be carried to the full time, the powers of constitution be not much reduced, and the scirrhus of small size, the woman may recover the shock of the labour, and subsequently

fall a victim to the disease; but many die during labour or very shortly thereafter; and labour in every instance hastens the progress of the malignant disease. The child's life is most frequently sacrificed, from the length of the labour, the pressure on the head, or the necessity for using embryospastic instruments.

The treatment of such cases must be guided by the extent of the disease, the size of the pelvis, and other circumstances. In a very few cases the labour may be left to nature, or be aided by the forceps. In other cases much more active interference is required. As neither blood-lettings nor injections could produce relaxation of the diseased structure, incisions have been recommended to be made into the diseased parts, and if such were more frequently done, Dr Lever thinks fewer women labouring under cancer of the uterus would die undelivered, and the chances of both the mother's life being prolonged and the child's life saved, would be much greater than when this plan is neglected. The author does not approve of extirpating the diseased parts to allow delivery to go on; nor yet of performing the operation of turning, since the violence done to the parts is sufficient to kill the mother, and the pressure on the child's head sacrifices the child. In cases where the structural change is so great that the application of the forceps is impracticable, and where the movements and auscultatory signs prove the child to be alive, it may be a question whether we are justified in sacrificing the child by opening its head, or whether the Cæsarean section ought to be performed. Dr Lever inclines justly to the latter alternative, as by this operation the child's life is saved; whereas, by destroying the child's life, we do not save the mother, as she generally dies immediately after delivery, or after a few weeks of intense suffering.

Six interesting cases of pregnancy attending cancer of the uterus are detailed, in which various forms of treatment were employed. The whole of the cases, indeed, with which the work is interspersed appear to be selected with judgment, and illustrate some useful practical point either in the symptoms, pathology, diagnosis, or treatment of the diseases of the uterus.

Art. IV.—*Chemistry of Animal Bodies.* By Thomas Thomson, M. D., Regius Professor of Chemistry in the University of Glasgow, &c., &c. Edinburgh, 1843. 8vo. Pp. 702.

It is well known that the chemical analysis of animal bodies and principles is in a very imperfect state, and that the chemical history of these substances is still very little known. The attention of chemists has been in general devoted mostly to the fluids of animal bodies, a few of the solids of more easy examination, as

bone, tooth, and shells, and those solid or stony substances which are the product of various morbid actions. The chief labourers in this field have been Wollaston, Hatchett, Berzelius, Bostock, John Davy, Vauquelin, Gay Lussac, Prout, Dumas, and Thenard, and of these labourers in the field the services have been great and essential.

Great improvements have, however, been effected in this department of chemical science, and much more accurate means of analysis have been devised. Hence many new substances and principles have been discovered; principles formerly confounded have been distinguished from each other by correct characters; others, imperfectly and obscurely known, have been fully described; and the whole subject has received fresh elucidation. It is no longer possible to treat of the chemistry of animal bodies as a mere appendage to a system of general chemistry. The impracticability of such a method may be allowed to have been demonstrated by Berzelius, in whose large work the portion devoted to the chemical history of animal bodies forms itself several volumes.

During several years past numerous chemists have been engaged in studying, with all the precision of modern chemistry, most of the animal solids and fluids. The labours of Mulder and Schwann especially have been conspicuous in adding greatly to the stock of chemical information, and much new light has been accordingly thrown on the chemical constitution of all animal substances.

In the present volume, which proceeds from one who has long devoted to chemical analysis, in all its most difficult and complicated departments, the energies of an ingenious and active mind, the object of the author is to present an extensive and uninterrupted view of the progress and the present state of our knowledge on the chemical analysis of animal bodies.

In the accomplishment of this duty Dr Thomson arranges his work in three great divisions; the first devoted to the chemical examination and history of animal principles; the second to the chemical history of the parts of animals; and the third, to the chemical history of the functions of animal bodies.

The first division again is subdivided into five parts, corresponding to the classes of chemical principles, the history of which is to be examined. These chemical principles or elements are the animal acids; the animal bases, as urea, odorine, ammolin, aposepedin, tannin, chitin, and ammonia; the intermediate animal oxides, as cystin, melan, diabetic sugar; the saponifiable oily oxides, as the substances familiarly known as varieties of fat; and the unsaponifiable oxides, as cantharine, cholesterin, and serolin; the animal colouring matters, as carmin, serum, cancrin, peristerin, and anserin; and the animal amides, or feculiform substances.

In the second division of his work Dr Thomson treats of the chemical history of the parts of animals under three heads; 1*st*, the solids or animal textures; 2*d*, the fluids; and 3*d*, morbid concretions, or the products of disease. This division presents a complete view of the present state of our knowledge on the chemical constitution of animal bodies.

The third division, which treats of the functions of animals, is the least considerable of the three. The author presents, nevertheless, a short but very luminous and instructive sketch of the chemical phenomena of digestion, respiration, the action of the kidneys, perspiration, and assimilation.

In the detailed execution of the plan now sketched, the author has shown his usual logical acuteness and methodical arrangement. The animal acids are distinguished into two orders; 1*st*, those void of azote; and 2*d*, those containing azote. Under the first order are treated such acids as the mesoxalic, the lactic, the suberic, the sebacid, the butyric, and the phocenic. Under the second order are found cyanogen, and its compounds, uric acid, pyuric acid, parabanic, oxaluric acid, and their congenerous substances.

The whole work must be regarded as a valuable contribution to the important division of chemical knowledge of which it treats; and it will doubtless form an indispensable treatise to the physiologist and whoever wishes to form clear notions on the chemical principles and chemical phenomena of animal bodies. In perusing the work, though the information is not always new, and indeed could not be expected to be so, yet the manner in which it is arranged, and communicated, is always calculated to give philosophical, clear, and new views on the relations of the chemical elements entering into the composition of the animal body, and the laws by which their actions and reactions are regulated.

In the first chapter of the second part we find a full, and, on the whole, accurate account of the chemical history of the blood and its component parts. One thing, however, we do not well understand. In speaking of the blood in diabetes, Dr Thomson, after adverting to the opinion of Dr Rollo, that the blood in that disease contains sugar, having received no confirmation from the experiments of Nicolas and Gueudeville, Vauquelin and Segalas, Wollaston, and Marcet, says, "I think it probable that it exists, but in so small a quantity as not to be recognizable, being constantly removed as fast as formed by the action of the kidneys;—just as urea cannot be discovered in healthy blood, though the experiments of Prevost and Dumas show clearly that it must exist in that liquid." Dr Thomson subsequently states that Dr Rees is the only chemist who has succeeded in finding sugar in the serum of diabetic blood, and his method of proceeding is not satisfactory.

At the statement now referred, we are at once surprised and grieved. We had been led to believe that other chemists besides Dr Rees had detected sugar in the blood of diabetic patients, and we consequently inferred that the conclusion was well founded. On the merit or satisfactoriness of the process of Dr Rees, we feel that it would be improper to express any opinion. But the matter does not rest on the testimony of that chemist alone. We know that Ambrosiani of Milan published in the *Annali Universali di Medicina* for April 1835, a process in which he examined chemically the blood of a diabetic patient, and obtained crystals of diabetic sugar. Mr Maitland also published in the Medical Gazette for March 1836, an account of the analysis of diabetic blood, in which he also obtained sugar in crystals. Mr Macgregor of Glasgow published in the same Journal for May 1837, a series of experiments, showing that not only the blood contains saccharine matter, but that saccharine matter may be obtained from the stomach. All these experiments preceded those of Dr Rees; and it seems singular, therefore, to represent the latter gentleman as the only chemist who has succeeded in detecting sugar in the blood of diabetic patients. Unless the accuracy of the experiments of Ambrosiani, Maitland, and Macgregor be wholly disproved, it must be allowed that they confirm the results obtained by Dr Rees, and that sugar really can be obtained from the blood of diabetic subjects.

Even within the last few weeks experiments have been published, by a writer in the Medical Gazette, tending to establish the accuracy of the same fact; so that, with all this corroborative evidence, it seems unreasonable to doubt the justness of the conclusion.

We regret that Dr Thomson has not given his opinion on the value of these experiments.

Both this portion of the work and that on the functions of animals contain a valuable and useful summary of the present state of our knowledge as to the chemical principles and actions of animal bodies.

The volume is concluded with an appendix on the mode of conducting the analysis of animal substances, on the instrument and apparatus required, and on the rules to be observed in conducting such processes. This appendix is a valuable addition to the volume, and may be studied with great advantage, by those who desire to understand thoroughly all the delicate rules and precautions to be observed in such researches.

ART. V.—*The Vital Statistics of Sheffield.* By G. CALVERT HOLLAND, Esq., M. D., Physician Extraordinary to the Sheffield General Infirmary, &c. &c. 8vo. London, 1843, pp. 263.

THE statistics of a large manufacturing town, drawn up by an able physician, and embracing almost every topic which can throw light on the habits, increase, physical and moral condition of the population, cannot fail to interest every philanthropist, and at the same time afford invaluable facts in a hygienic point of view. The mode in which Dr Holland has completed his task is beyond all praise; for it may with perfect safety be affirmed, that we do not possess in any language a more complete detail of all the numerous circumstances connected with the moral and physical condition of the population described.

Sheffield may be described as being chiefly situated on a peninsulated area, three sides of which are formed by the rivers Don, Sheaf, and Porter. The apex of this area rises into a boldly swelling hill, which runs through the centre and western portions of the town. The town is peculiarly favoured by the possession of great mineral riches,—iron ore, carboniferous and magnesian limestone, and coal, being all in its immediate neighbourhood. It is well suplied with water brought from a distance of several miles; and the population differs in many important respects from that of many other manufacturing districts. The labouring classes are higher in intelligence, morality, and physical condition than where machinery is extensively used; the middle classes consequently form a greater proportion of the population; and the merchants and manufacturers are not men of large capital, and are far from treading on the heels of the aristocracy, as in most great manufacturing towns. In the manufactures carried on at Sheffield, no improvements in machinery can supersede to any great extent the necessity for adult manual labour. There is, consequently, less destitution, misery, and ignorance than in towns where soft goods are manufactured; and, on the other hand, there is less opulence and extravagance.

Dr Holland, to give a general view of the nature of the soil and climate, subjoins a list of the Phenogamous plants growing in the neighbourhood of the town, as also those of the Cryptogamic class, belonging to the orders Filices, Equisetaceæ, and Lycopodineæ. A list of the Birds, Mammalia, and Fishes are given with the same view; and this portion of Dr Holland's labours would have been complete had he added the few Reptiles which are to be found in the neighbourhood. From the barometric and thermometric tables of 1837 and 1838, which are appended to this part of the work, it would appear that 29.72 inches of rain fell during 1837, but

32.54 inches in 1838. The mean height of the barometer was 29.18 inches in 1837, and 29.11 in 1838. The mean annual temperature was 48°.1′ in 1837, and 45°.9′ in 1838.

Few manufacturing towns have increased more rapidly in population than Sheffield. In 1736, the population of the parish of Sheffield, including the townships of Sheffield, Brightside Bierlow, Ecclesall Bierlow, Nether Hallam, Upper Hallam, and Attercliffe-cum-Darnall, was only 14,105; in 1801, it had increased to 45,758; in 1811, to 53,231; in 1821, to 65,275; in 1831, to 91,692; and in 1841, to 112,492. Of this last number 55,566 were males, and 56,926 females. In 1831, the number of houses occupied was 18,331, which gives a proportion of only 5 persons to each dwelling; but in 1841, no fewer than 23,024 houses were occupied, which gives a proportion of 4 and a fraction to each house. Dr Holland justly regards this fact as a proof of the higher physical, moral, and intellectual condition of the people; as a proof of the ability of the great mass to occupy separate houses, instead of congregating in masses under the same roof, as is seen in all great manufacturing towns where much misery exists.

Many interesting details are given relative to the proportion of unlet houses, the exports of cutlery, &c. to the United States, the probable causes of the present depression in trade, the effect which the late depressed condition of the markets has had in checking the increase of the population, &c. Relative to the last point, Dr Holland shows that, had the population continued increasing in the same ratio for the last ten years as it did the ten years before that, in 1840 the population would have amounted to 117,660; whereas in 1841 it was found to be only 112,492.

A very instructive table is given of the amount of money paid to the regular poor and to the casual poor since 1837, the year following the great commercial distress. From this it appears, that, notwithstanding the almost complete stagnation of manufactures, and "after four years of suffering, the average weekly payments were only L. 50." Dr Holland justly adduces this fact as indicative of a "gradual improvement in the intelligence, morality, and independence of the labouring classes;" for, instead of falling at once on the parish, "such was their independence, and the resources on which they had to fall back, that it was years before the pressure of their necessities was felt by the parish."

It would be almost out of place to notice in detail the instructive matter contained in the chapter on the "Comparison between the Present and Past Periods of Manufacturing Distress." It may not, however, be uninteresting to compare the average cost of maintenance of each inmate of the poor-house with that of those in our northern capital. In 1820, the average cost of each inmate of the Sheffield Poor-House was 3s. 3½d. per week; in 1830, 2s.

10½d.; in 1840, 2s. 8d.; and in 1842, 2s. 7d. In Edinburgh, the cost of each inmate of the West Church Poor-House, which is on a much more efficient and economical system of management than that of the city, was, for 1835, 8s. 8¾d. per month for each inmate; in 1840, 9s. 8¼d.; and in 1842, 9s. 3d. per month, or about 2s. 1½d. per week. This was including all expenses. In the City of Edinburgh Charity Workhouse, the average expense of each inmate for 1842 was 11s. 8½d. per month, or about 2s. 8½d. per week.

The system of out-door relief differs, however, most materially in Scotland and in England; for while in Sheffield the casual poor received, if unmarried, 1s. 6d. per day, or if married, 2s., and 6d. for every additional child under 9 years of age, in Scotland they do not, even in cases of destitution, receive above the same amount per week, and in many cases not above 1s. per week.

A striking peculiarity of the population in Sheffield, and one which of itself marks the comfortable situation of the labouring classes is, that they "have usually an entire house for themselves, and the cases are indeed rare in which two families are found under the same roof." The contrast with other manufacturing towns in this respect is very striking. For while Manchester, Liverpool, Glasgow, and Paisley, have their thousands of families living in cellars and single rooms, and in many cases even several families in the same room, no such thing is known in Sheffield.

We pass over the "inquiry into the causes of unoccupied houses," which Dr Holland proves, by a reference to facts, to depend on over-speculation in building during the flourishing years which preceded the failures of 1836. The chapter is well worthy an attentive perusal by those who interest themselves in political economy.

The house accommodation in Sheffield, as compared with other towns, we have above alluded to, so that it is unnecessary to go over the particulars which Dr Holland collects in his fifth chapter.

The state of the streets, roads, and highways, and the expenses of their maintenance, need not here be noticed, though the information would prove highly valuable to road trustees and managers of police-boards.

The "physical condition of the population" forms, in a medical point of view, the most valuable portion of Dr Holland's work. The number of births from July 1st 1841 to June 30th 1842, was 3451, while the deaths for the same period were 2284. Of this mortality, 546 died under one year; 326 between 1 and 2 years; and 293 from 2 to 4 years; 48 died between 80 and 90 years of age; and 10 between 90 and 100. It thus appears that the mortality under 5 years of age is actually higher than in most other parts of the kingdom, notwithstanding the apparently favourable condition of the population; and the number who live beyond

their 70th year is proportionally smaller. The following table of the proportion of deaths of children under 5, and of the aged above 70, out of every 1000 deaths at different places, will illustrate this.

	Under 5.	Above 70.
Manchester and Salford,	517	58
Sheffield,	506	71
Leeds,	504	74
Liverpool and West Derby,	480	63
Birmingham,	453	80
London,	401	103
England and Wales,	393	143
Yorkshire and Durham,	322	206

From the tables appended it would appear that the mortality in Sheffield is nearly one-third greater during the winter months than during the other quarters of the year, being 740 for the winter; 485 for spring; 501 for summer; and 456 for autumn. The same difference, however, seems not to obtain in other towns to anything like the same extent. Thus the mortality for the seasons in the subjoined towns was as follows

	Winter.	Spring.	Summer.	Autumn.
Huddersfield,	561	547	444	444
Halifax,	614	549	488	621
Bradford,	885	835	820	783
Leeds,	1335	1165	1133	982
Hull,	244	271	270	257
York,	313	314	255	251

Dr Holland, in his observations on these facts, seems to have forgotten the true cause of this increased mortality during the winter months as observed in Sheffield. He tries to attribute it to faults in the mode of registration, by confounding the inhabitants of the town with those of the surrounding district. The true cause, however, or, to speak more correctly, the probable cause, was many years ago pointed out by M. Quetelet, in his able Statistical Researches on Belgium. In this he showed that the higher the situation of a town or district above the level of the sea, and, consequently, the greater the diurnal variation of temperature, the greater was the ratio of mortality affected by season. There can be no doubt that this is the true explanation of the fact in so far as Sheffield is concerned. Situated at nearly equal distance from the Eastern and Western Oceans, and at the foot of a range of hills whence rise many rivers which diverge to either sea, it is peculiarly exposed to those diurnal alternations of temperature which M. Quetelet has so ably shown powerfully influence the ratio of mortality during those seasons of the year when these changes are greatest. This fact at once explains why the mortality in a place situate like Sheffield should be greatest during winter; next greatest during summer; and least in autumn. Dr

Holland, however, is so far right in his remarks on the generally increased mortality in towns. M. Quetelet also satisfactorily proved, and the same has since been confirmed by numerous statistical writers, that, other things being equal, the mortality is greater in proportion to the numbers congregated together. That cities or towns are more unhealthy than villages; villages than hamlets; and these again more unhealthy than scattered cottages.

A table is given of the causes of death in the Sheffield registration district from the year 1838 up to 1842. From this table it appears that the number of deaths from consumption has diminished from that year in a regularly decreasing ratio. Thus, in the year 1838, there died from consumption 435; in 1839, 390; in 1840, 362; in 1841, 237; and in 1842, only 210. Dr Holland, in commenting on the ratio of deaths from consumption, makes what appears to be an awkward mistake. In showing the proportion of deaths each year, he mentions that 19 per cent. of the deaths for 1841 occurred from consumption, whereas, according to his detailed table of the whole deaths, it is apparent that exactly 10 per cent. only died from consumption during that year. The per centage of deaths from consumption, therefore, has gradually decreased, as above stated, from 19 out of every 100 deaths, which it was in 1838, to 15 per cent. in 1839, to 13 per cent. in 1840, and to 10 per cent. in 1841. If the proportion of deaths from consumption be compared with the numbers living, Sheffield does not seem to suffer more from consumption than other towns, notwithstanding the deleterious nature of the professions of many of the artisans. This will be best exhibited by the following short table, in which the proportion of deaths from consumption to 1000 living is exhibited.

Sheffield,	4.98	Manchester,	5.10
Leeds,	4.01	London,	4.02
Birmingham,	4.94	Liverpool,	6.70

Typhus fever, again, is by no means prevalent in Sheffield; and though Dr Holland does not comment on the striking fact which his table exhibits as to this, when compared with other towns, it is especially worthy of remark. Thus, in 1000 deaths the proportion of deaths from typhus fever stands thus in the following places.

Sheffield, three years,	15.51	London,	78.55
Leeds,	46.88	Manchester and Salford,	75.30
Birmingham,	53.38	Liverpool and West Derby,	108.33
England and Wales,	63.90		

Now, all the facts known with regard to typhus fever seem to prove that an unhealthy, low-lying situation, and a crowded, ill-fed, and ill-clad population are the two most fruitful sources of typhus fever. When it breaks out in such a situation it gene-

rally spreads as an epidemic, and among such a population its contagious nature tends still more widely to extend its ravages. At Liverpool, Manchester, and London, where the mortality from typhus is high, it is well known these causes are present; and it is very instructive to remark, that in a well-aired, and well-situated town like Sheffield, where the labouring classes, instead of crowding in hovels, have separate houses, and are well-fed, the proportion of deaths from typhus fever is scarcely worth mentioning, being at the minimum of only 15 in 1000 deaths.

In order to ascertain the nature of the diseases prevalent among the artisans, and the nature of their trades, Dr Holland gives a table of the trades of 200 patients, their respective ages, and the diseases with which they were chiefly affected. But these tables lose much of their interest, as in the same place we are not informed as to the numbers of workmen of the same classes who are in the town, and the table only extends to those who applied to the poor-house, so that it gives, in reality, no fair estimate of the proportions of each class of artisans affected, nor even of the peculiar maladies prevalent. Of the 200 cases, however, it was found that 60 laboured under affections of the air passages; 51 under disease of the stomach and bowels; 25 rheumatism; 19 diseases of the nervous system; 10 under fever; and smaller numbers under other affections. We shall have occasion afterwards to notice the mortality and proneness to disease in the separate branches of manufacture, so that we may pass over any remarks on this subject in this place.

Numerous interesting tables follow, in which the proportion of births and deaths to individuals living is given; also the population of the different districts of the town and parish of Sheffield; and the proportion of deaths in each. This last illustrates what we above noticed of the different ratio of mortality for town and country; for while we find that 1 out of every 35.5 dies annually in the township of Sheffield, only 1 in every 56.7 dies in the agricultural district of Handsworth,—in its immediate vicinity. Take the same in its details and the same result is arrived at. In the township of Sheffield 513 out of every 1000 souls die under 5 years of age, and only 67 survive the age of 70; whereas, in the agricultural district of Handsworth only 434 die under 5 years of age, and no fewer than 158 survive the age of 70. If the average duration of human life be calculated from the mortality tables the very same result is arrived at. In all those subdivisions of the registration district of Sheffield, where there is an intermixture of rural population, the average duration of life is greater than in town districts. Thus, in the township of Ecclesall Bierlow, while the mean ages of all individuals extends only to 23 years, the mean duration of life of the rural population averages 26 years. Even

this, however, is below the average duration of life over England and Wales, which is 29 years; while it is so low as 21 years at Leeds; 24 at Birmingham; but so high as 33 in Devonshire. The average duration of life may, however, be approximatively arrived at from a consideration of the mean duration of life in those who survive certain ages. Thus we showed above that the agricultural districts around Sheffield, exhibit a greater average duration of life than the town districts. In accordance with this, if we take the average duration of life of those who survive 5 years of age, we find it to be only 41 and a fraction for the township of Sheffield, but 47 and a fraction for the district of Handsworth.

Dr Holland, after many elaborate tables and calculations to the same effect as those above quoted, takes occasion to remark, that he is inclined to doubt whether the mean duration of life has increased to any appreciable extent in later years. As to one point, he has "no hesitation in asserting, that the sufferings of the working classes, and consequently the rate of mortality, are greater now than in former times." And he feels inclined to believe that "the supposed gain on the side of longevity arises chiefly from two circumstances,—a relatively much more numerous middle class than formerly existed in the possession of the means of comfort and independence, and a better state of morals, or, perhaps, more correctly speaking, less grossness of dissipation, both in the middle and higher classes of society."

Dr Holland suggests that, to attain that accuracy which is requisite for drawing just conclusions as to influence of improved modes of living, of riches, or of poverty on the population, we would require to have the births and deaths of the different classes of society arranged by themselves; for at present, while the average duration of life of the middle and higher classes may be actually on the increase, that of the lower classes may be falling lower, in consequence of the increased amount of misery and destitution created by failures in the great manufactures. As illustrative of this is adduced the classed table of the three classes of society at Leeds, the upper, the middle, and the lower, from which it appears that the mean age at death of the upper class is 44 years; the mean age of the middle class, 27 years, while the average duration of life of the lower class is only 19 years. It cannot be doubted that it is by classifying the population in this way that the influence of improved modes of living or of changes in the habits of the people are to be judged of; and it is very desirable that classified tables similar to those of Leeds were kept of the population of other towns or districts of country. From this being neglected, we may be led into the belief that society is gradually improving in its moral and physical condition, when the most numerous class may not only be stationary, but in the pro-

cess of rapid deterioration. We, therefore, cordially agree with Dr Holland in the propriety of urging on those with whom the superintendence of the registrations lie, the importance of this classification. Such a classification is, in fact, as loudly called for as the attaining accurate returns of every individual disease of which the population has died.

The statistics of the savings bank we pass over, as the learned author remarks, that it "affords no indication whatever of the more or less prosperous state of manufactures, or of the circumstances of the artisans generally.

The chapter on the moral state of the population is a most interesting one. Dr Holland attributes the prevalence of crime and immorality among the manufacturing population to four causes, which appear to be inseparable from manufactures as at present conducted. These are, 1. The crowding together of the working classes into narrow streets, alleys, &c.; 2. The fluctuating nature of manufactures; 3. The early employment of children in manufactures; and 4. The employment of girls and women in the same manufactories as men. It is shown, by a reference to the commitments for trial, that, during a period of depression in trade, crime increases among the labouring class to a frightful extent, the difference between a prosperous year, 1835, and a year of depression, 1839, being no less than an increase for the latter year of 46 per cent. The difference between 1835 and the two last years in this respect are still more striking, and from the same causes. In 1835, there were only 1009 disorderlies, while for the last two years they have increased twofold. Crime is, therefore, unquestionably on the increase, and Dr Holland is of opinion that this is to be counteracted, not by the enlargement of prisons, but by judicious and liberal measures of education.

A great portion of the remainder of the work is taken up with the particulars relative to a few of the chief trades or manufactures carried on in Sheffield; the nature of the employment; the number of men, women, boys, and girls employed in each several trade; the proportions able to read and write; whether they are connected with trades' unions, &c. &c. In this minute manner he goes over the silver and plated manufacture, the saw manufacture, edge tool trade, spring knife manufacture, file trade, and fork grinders. It is the last of these occupations which is especially destructive to life, and this in consequence of the grinding of forks being conducted on a dry stone, in consequence of which the operator is continually inhaling the fine particles of dust and metal which rises in clouds and pervades the atmosphere to which they are confined. In 1820, there belonged to one of the unions of this trade 80 men, and in five years thereafter 20 of that number had died, 6 under 24 years of age, six under 30, 2 at 31, 3 at 34, 1 at 40,

and 2 at 50. These last two entered the trade late in life, one of them after having served twenty-three years in the army. No records are kept of the deaths of those under 21, but it is an ascertained fact that a fourth of the number employed died every five years. Almost all those in this trade who pass their 34th year are observed to be those who have joined it late in life, or after having been soldiers or sailors, &c.

From the recorded deaths of the fork-grinders at Sheffield from 1825 to 1840, it would appear that the per centage is nearly three times greater than that of the population of England and Wales between the ages of 20 and 50. Thus, of 1000 deaths above 20 years of age over England and Wales, only 160 occur between the ages of 20 and 30, but 475 fork-grinders die out of every 1000 during the same period of life. The chief mortality among fork-grinders occurs from diseases of the lungs and air passages causing symptoms commonly known by the name of "grinder's asthma," and sometimes, when it procceds to phthisical symptoms, by the name of grinder's rot. Of 97 grinders examined by Dr Holland, no fewer than 30 were found labouring under this disease.

Dr Holland concludes this portion of his work by giving a very elaborately calculated table of the mean ages attained by several of the different grinders at Sheffield dying above certain ages, as compared with the mean mortality of England and Wales and the midland counties. The table is so instructive, we give it entire.

Giv. age.	Saw Grinders.	Scissor Grinders.	Razor Grinders.	Pen blade Grind.	Needle Grinders.	Fork Grinders.	Sheffield Registrtn. District.	Engd. and Wales.	Midld. Counties.
20	48.68	38.23	31.88	32.73	31.17	29.73	52.39	54.97	57.00
25	49.33	40.39	34.87	36.22	33.86	32.85	54.36	57.52	59.71
30	50.50	42.82	38.09	39.67	36.77	36.01	56.25	60.06	62.28
35	51.97	45.53	41.53	43.08	39.90	39.21	58.83	62.55	64.66
40	53.77	48.53	45.21	46.45	43.25	42.44	61.57	64.90	66.76
45	55 88	51 80	48.73	49.79	46.82	45.71	64.11	67.16	68.68
50	58.30	55.36	53.25	53.09	No	No	66.64	69.36	70.45
55	61.04	59.20	57.60	56.34	data.	data.	69.21	71.60	72.25
60	64.09	63.31	62.19	No	—	—	71.90	73.96	74.29
65	67.46	No	No	data.	—	—	74.80	76.49	76.58
70	71.15	data	data.	—	—	—	77.93	79.26	79.24

The rest of the volume is taken up with matters which, however great may be their importance in a general view, and as exhibiting the moral feelings and habits of the population, are scarcely fitted for notice in a medical work. These are, the Histories of the Sick Clubs, Friendly Societies, Secret Orders, the Amount of Religious Instruction and Education in the various Townships of the Sheffield Union, Mechanics' Institution and Library, the Literary and Philosophical Society, School of Design, Licensed Vic-

tuallers and Beer Houses, Town Trust, &c. A very few remarks are also made on the charitable medical institutions, the chief of which are the infirmary and a public dispensary. The Infirmary, which was opened in 1797, receives both in and out-patients; and Dr Holland gives in two tables the numbers of these respective classes of patients who were treated from 1822 to 1841. During this period it appears that of out-patients, 22,395 were cured, 7605 were relieved; 617 were dismissed by their own desire; 6251 dismissed for non-attendance; 1072 were not relieved; 80 were incurable; 940 were made in-patients, and 535 died. Of the in-patients for the same period, 6481 were cured; 1345 were relieved; 385 were dismissed for irregularity; 359 were dismissed by their own desire; 207 were not relieved; 41 were incurable; 6874 were made out-patients, and 611 died. The Dispensary gives relief to between 2000 and 3000 annually. Dr Holland, however, is far from approving of the extent to which gratuitous medical service is administered to the poorer classes. He justly objects to the well-paid and regularly employed operative taking advantage of a charity which was originally instituted for the poor and destitute; and he quotes from his excellent treatise on the "Abuses and Evils of Charity, especially of Medical Charitable Institutions," that portion where he defines some of the conditions which ought to exclude from a participation in the charity. On this subject our space will not permit us to enlarge at present; but, from our own observation with regard to medical charities in this town, we feel inclined to agree with Dr Holland, that, whatever may be the amount of relief, the demand will always be equal to it; because the more liberal and expansive the charity, the greater are the opportunities and inducements to take advantage of its benefits.

ART. VI.—*Lectures on the Comparative Anatomy and Physiology of Invertebrate Animals, delivered at the Royal College of Surgeons in* 1843. By RICHARD OWEN, F.R.S. Hunterian Professor to the College. *From Notes taken by William Whyte Cooper, M.R.C.S. and revised by Professor Owen.* Illustrated by numerous Woodcuts. London, 1843. Pp. 392.

A work on Comparative Anatomy from so experienced and well-informed an anatomist as Mr Owen cannot fail to be instructive; and with the present lectures the profession in general, and students of comparative anatomy and physiology in particular, will, we are confident, not be disappointed.

In the various systems of Comparative Anatomy by Cuvier,

Blumenbach, Meckel, and Carus, the Vertebrated Animals necessarily receive a large proportion of attention; and though the anatomy of the Aspondylous tribes is by no means neglected by these authors, it is treated, perhaps, with less detail than it deserves. The anatomical structure of these apparently insignificant and often little-known animals, many of which are entirely microscopical, is often of the highest importance, and discloses facts which are of the utmost utility in enabling us to understand the structure of the higher animals and the animal kingdom at large. All animals are formed, as it were, on the same type. In the Aspondylous animals, the process of nutrition and digestion is in so simple a form, that many of its phenomena approach to the simple imbibition of vegetables, and in all the process of nutrition appears in a shape so palpable as to throw light on the functions of the higher animals. The function of circulation, also, is in these animals performed in a manner extremely simple, and from their translucency, its phenomena may be studied with great facility in many of them.

The value, therefore, and the utility of a good treatise devoted to the elucidation of the structure and functions of these minute animals is undeniable; and by no one could it be expected to be more ably performed than by Mr Owen, who, it is well known, has devoted much time and labour to the subject.

The classification of these animals given by Mr Owen is modified from Cuvier in the following manner:

Kingdom ANIMALIA.
Sub-kingdom *VERTEBRATA.*
Class MAMMALIA.
AVES.
REPTILIA.
PISCES.

Sub-kingdom *ARTICULATA.*	Sub-kingdom *MOLLUSCA.*
Class CRUSTACEA.	Class CEPHALOPODA.
ARACHNIDA.	GASTEROPODA.
INSECTA.	PTEROPODA.
ANELLATA.	LAMELLIBRANCHIATA.
CIRRIPEDIA.	BRACHIOPODA.
	TUNICATA.

Sub-kingdom *RADIATA.*

Nematoneura. *Acrita.*

Class RADIARIA, Lamarck.

ECHINODERMA, Cuv. ACALEPHA, Cuv.

Class POLYPI, Cuv.

CILIOBRACHIATA, Farre. ANTHOZOA, Ehrenb. NUDIBRACHIATA, Farre.

Class ENTOZOA, Rudolphi.

CŒLELMINTHA, Owen. STERELMINTHA, Owen.

Class INFUSORIA, Cuv.

ROTIFERA, Ehrenb. POLYGASTRIA, Ehrenb.

He then begins with the lowest in the scale, the *Polygastria* and the *Rotifera*, the two divisions of the INFUSORIA. Next to these come the anatomy and physiology of the ENTOZOA, or parasitical animals, in two tribes, the Cœlelmintha and Sterelmintha. The chapters devoted to the elucidation of the structure of these animals show great attention and accuracy in observation and description. The following account of the worm found in the muscles of man, the *Trichina spinalis*, will be perused with interest.

"The cysts are very readily detected, by gently compressing a thin slice of the infected muscle between two pieces of glass and applying a magnifying power of an inch focus. They are of an elliptical figure, with the extremities more or less attenuated, often unequally elongated, and always more opake than the body or intermediate part of the cyst, which is, in general, sufficiently transparent to show that it contains a minute coiled-up worm. The usual size of the cyst is one-fiftieth of an inch in the long diameter, and one- hundredth of an inch across their middle part. The cysts are always arranged with their long axis parallel to the course of the muscular fibres, which probably results from their yielding to the pressure of the contained worm, and becoming elongated at the two points where the separation of the muscular fasciculi most readily takes place, and offers least resistance.

"The innermost layer of the cyst can sometimes be detached entire, like a distinct cyst, from the outer portion, and its contour is generally well marked when seen by transmitted light. By cutting off the extremity of the cyst, which may be done with a cataract needle or fine knife, and gently pressing on the opposite extremity, the Trichina and the granular secretion with which it is surrounded, will escape; and it frequently starts out as soon as the cyst is opened.

"When first extracted the Trichina is usually disposed in two or two and a half spiral coils; when straightened out it measures one-thirtieth of an inch in length and 1.700th of an inch in diameter, and now requires for its satisfactory examination a magnifying power of at least 200 linear admeasurement.

"The worm is cylindrical and filiform, terminating obtusely at both extremities, which are of unequal sizes; tapering towards one end for about one-fourth part of its length, but continuing of uniform diameter from that point to the opposite extremity.

"Until lately it was only at the larger extremity that I have been able to distinguish an indication of an orifice; and this is situated

in many specimens in the centre of a transverse, bilabiate, linear mouth.

"The anterior third of the alimentary canal is more even than the remaining part, which presents a sacculated appearance; in this respect the *Trichina* resembles the newly excluded young of *Ascarides* and *Strongyli*. A small rounded cluster of granules of a darker or more opaque nature than the rest of the body is situated about one-fifth of the length of the animal from the larger or anterior extremity, and extends about half-way across the body.

"The worm has no organic connection with the cyst; sometimes two *Trichinæ*, rarely three, occur in the same cyst."—P. 63.

The Polypi come next, and lead to various interesting discussions. The account of the formation of coral rocks, abridged from Mr Darwin, is perhaps the best short description yet published.

"These zoophytic productions have been recently classified by Mr Darwin under three heads 'atolls,' 'barrier reefs,' and 'fringing reefs.' The term *Atoll* is the name given to the coral-islands or lagoon-islands by their inhabitants in the Indian Ocean. An Atoll consists of a wall or mound of coral rock rising in the ocean from a considerable depth, and returning into itself so as to form a ring, with a lagoon, or sheet of still water in the interior. The wall is generally breached in one or more places, and when the breach is deep enough to admit a ship, the atoll affords it a convenient and safe harbour. The outer side of the reef usually sinks to a depth of from two to three hundred fathoms, at an angle of forty-five degrees or more: the internal side shelves gradually towards the centre of the lagoon, forming a saucer-shaped cavity, the depth of which varies from one fathom to fifty. The summit of the exterior margin of the reef or wall is usually composed of living species of *Porites* and *Millepora*. The *Porites* form irregularly rounded masses of from four to eight feet broad, and of nearly equal thickness; other parts of the reef are composed of thick vertical plates of the *Millepora complanata* intersecting each other at various angles, and forming an exceedingly strong honey-combed mass. The dead parts of these calcareous skeletons are often cemented over with a layer of the marine vegetable called *Nullipora*, which can better bear exposure to the air.

"This strong barrier is well fitted to receive the first shock of the heavy waves of the unfathomable ocean without; and what at first appears surprising, instead of wearing away at its outer edge, it is here only that the solid reef increases. The coral animals thrive best in the surf occasioned by the breakers. Through this agitation an ever-changing and aerated body of sea water washes over their surface, and their imperfect respiration is maintained at the highest state of activity. Abundant animalcules, and the like objects of food, are thus constantly brought within the sphere of the tentacula of the hungry polypes. Their reproductive gemmules are rapidly and extensively dispersed amongst the crevices of the calcareous mass.

"By the force of unusual storms this outer reef is occasionally breached, and huge masses are torn off and driven towards the lagoon, where they form an inner barrier or reef. The broken surface becomes the seat of attachment of the young of the neighbouring corals, the successive generations of which, by the rapid growth and development of their calcareous skeleton, soon repair the damage of the storm. The masses of broken coral thus driven inward towards the lagoon, accumulate in time to the height of some feet above high water. These fragments are mixed with sand and shells, and form a favourable soil for the development and growth of vegetables as cocoa palms, the large nuts of which may be borne hither by currents of the ocean, from Sumatra or Java, 600 miles distant. Turtles likewise float to the nascent island, browse on the sea-weeds which grow in the lagoon, and breed there. Numerous species of fish and shell-fish flourish in the same still water, which abounds with animal life. Man comes at length and takes possession of the island; and the cocoa-nut, the turtle, and the fish afford him abundant and wholesome food. But you will ask how he supplies himself with that necessary of life fresh water? This is obtained in a very simple and unexpected manner from shallow wells, dug in the calcareous sand, which ebb and flow with the tides, yet are almost wholly free from the saline particles of the ocean. Some have supposed that the sea-water lost its peculiar salts by infiltration through the calcareous mass. Mr Darwin thinks that it is derived from the rain water, which, being specifically lighter than the salt, keeps floating on its surface, and is subject to the same movements: howsoever this may be, the fact is certain. A fit and convenient abode for the human species is fabricated by the action of the feeble, gelatinous polypes, and a wild and almost boundless waste of waters is enlivened by oases which navigators have described as earthly paradises.

"A Barrier Reef is essentially similar to the Atoll or Coral-Island. It runs parallel with the shores of some larger island or continent; separated, however, from the land, by a broad and deep lagoon channel and having the outer side as deep and steep as in the Lagoon Islands. Here likewise the skeletons of the Zoophytes, of which the reef is composed, are found on the outer precipitous wall as deep as sounding line can reach.

"The third class of coral productions which Mr Darwin terms "Fringing Reefs" differ from the Barrier Reefs in having a comparatively small depth of water on the outer side, and a narrower and shallower lagoon channel between them and the main land.

"These differences in the characters of the wonderful fabrications of the coral animalcules are explicable by the following facts in their physiology. The animals of the *Porites* and *Milleporæ* cannot exist at a greater depth than twenty or thirty fathoms; beyond this the stimuli of light and heat derived from the solar beams become too feeble to excite and maintain their vital powers. On the other hand, their tissues are so delicate, that a brief direct exposure to the sun's rays kills them; and unless they are constantly

immersed in water or beaten by the surf, they cannot live. Thus, in whatever position the calcareous skeleton of a Madrepore or Millepore, may be found, it is certain that it must have been developed within thirty fathoms of the surface of the ocean. If it coats the summit of the lofty mountains of Tahiti, it must have been lifted above the sea by the elevation of the rock on which it was originally deposited. If it is brought up from the depth of 200 or 300 fathoms, as at Cardoo Atoll or Keeling Atoll, it must have been dragged down to that depth, by a gradual subsidence of the foundation on which the living madrepore once flourished. It is by these movements of upheaval and subsidence of the earth's crust, that Mr Darwin explains the different forms which characterise the extraordinary productions of the coral animal. The *Atolls* or Lagoon Islands, according to this author, rest on land which has subsided, and part of which was once dry. *Barrier reefs* indicate the islands or continents, which they encircle, to be the remains of land now partly submerged, and perhaps in progress towards final disappearance. *Fringing reefs*, on the contrary, indicate either that the shores are stationary, or that they are now rising, as in most of the Sandwich Islands, where former reefs have been raised many yards above the sea.

"Elizabeth Island, which is eighty feet in height, is entirely composed of coral-rock. The coral animals, thus progressively lifted above their element, are compelled to carry on their operations more and more remote from the former theatres of their constructive energies, but cannot extend deeper than their allotted thirty fathoms: the direction of their submarine masonry is centrifugal and descending. Where the land that supports them is, on the contrary, in progress of submergence, they are compelled to build their edifices progressively higher and in a narrower circuit: in other words, the direction of their growth is centripetal and ascending. The terms ascending and descending of course only here apply to the relation of the coral-builders to the land, not to the level of the unchanging sea."—Pp. 89–92.

Then follow in order the anatomy and physiology of the ARTICULATA and MOLLUSCA.

Under the head of *Arachnida*, in the nineteenth lecture, is given a short account of the minute microscopic parasitical insect lately discovered in the sebaceous follicles and piliparous sacs of the human skin, by Dr Simon of Berlin, and described in Muller's Archiv. fur Physiologie, (1842, p. 218.) As our limits permit us not to introduce the description of the follicular parasite here, we give it in the Medical Intelligence.

Our limits will not allow us to follow the author through all his details on the multiplied genera and species of these families. But we would recommend the present work as containing the fullest and the clearest account extant of the division of the Aspondylous or Invertebrated animals, enlivened by much instructive information on the functions of these animals.

[ADDENDUM TO ORIGINAL COMMUNICATIONS.]

ART. XIII.—*On some of the Characters which distinguish the Fever at present Epidemic from Typhus Fever.* By PROFESSOR HENDERSON. (Read before the Medico-Chirurgical Society of Edinburgh, December 6, 1843.)

PAINFULLY sensible as I am of the difficulties which beset an attempt to draw the line which may distinguish continued fevers into separate groups, essentially different in their causes and characters, and of the perplexity and confusion in which the whole subject of continued fevers is so well known to be involved, I can hardly expect the society to anticipate much profit or satisfaction from the disquisition which forms the subject of this essay. Many who hear me have doubtless risen from the study of continued fevers, as their history and pathology are detailed in the numerous treatises which profess to throw light on them, persuaded that little can have been actually determined respecting them since authors differ so much in their descriptions of them, and hold such conflicting views of their nature, of their number, and of their origin. Struck with the vague, unphilosophical, and meagre statements, which, for the most part, are advanced as facts on the subject of continued fever, and the glaringly arbitrary principles on which their classification is founded, those who have bestowed considerable attention on the literature of this class of diseases may be so far prejudiced against a new attempt to point out the characters which essentially distinguish some of them, as to expect that it shall consist of little else than a variation of the customary methods and statements, and another contribution to the hypothetical views which abound on the subject to which it relates. I beg, therefore, to remark at the outset, that I shall confine myself, in so far as the chief object of this paper is concerned, to a concise declaration of facts, and of such only as I have been enabled to determine with precision and certainty, adding merely such inferences as may appear to be plainly warranted by the particulars which shall be adduced.

It will not be without advantage that I should first advert to the peculiar difficulties which encumber inquiries into the subject of fevers, and which have been chiefly instrumental in prolonging the unsatisfactory state of their pathology and classification. These, I think, may be reduced to three heads.

1. The first is, that continued fevers have a number of characters which are common to them all. It is this circumstance, indeed, which has led to their common denomination; and, as the coincidences among them consist of those prominent characters by which they are broadly distinguished from other diseases, it has happened to them, as to nations and communities, that their common disagreements with others, and the similarity in certain points among themselves, have gradually appeared to efface, or diminish very much, the features by which they should be distinguished from one another.

on account of an osteo-sarcomatous affection, the whole jaw was removed at its articulations. The patient speedily recovered, and was a few months afterwards exhibited at Padua, to the Italian Scientific Association. He had completely regained his health, swallowed easily, and his speech was scarcely defective. It is much to be regretted that the details of this case are not given; it may, however, be gathered from the remarks which follow the simple announcement of its success, that the bone was extracted piece-meal, being divided into portions by means of the cutting pliers introduced through subcutaneous incisions. It is to this mode of operating the author attributes the small quantity of blood lost, the rapidity of the healing process, and the general success of the operation. No mention, however, is made of the size of the tumour, the amount of the lower jaw which it involved, or the necessity which existed for removing the whole bone.

Successful case of removal of two Ovarian Tumours. By Dr JOHN ATLEE, (*New York Journal of Medicine*, September 1843.) A lady under thirty years of age, and unmarried, had suffered from ascites for the last three years. She had been tapped four times, but, as it was discovered after the third operation, that two ovarian tumours existed, and these were thought to be the cause of the dropsy, their removal was proposed, and the patient consented thereto.

An incision about 9 inches in length was made in the course of the *linea alba*, commencing above the pubes, into the cavity of the abdomen. The intestines being pushed aside, the left ovarian tumour was found attached merely by the round ligament, in other respects it floated free on the abdomen. The tumour on the right side adhered for about two-thirds of its extent to the brim of the pelvis, and also to the omentum. Both tumours were carefully removed without hæmorrhage following to any great extent. The wound was brought together by the interrupted suture; not a single unfavourable symptom occurred, and by the seventh week the whole wound had united, excepting at the lower angle, where the ligatures which surrounded the round ligaments were hanging out. At that time she took carriage exercise, and seemed in perfect health.

Spina Bifida treated successfully by repeated punctures. By Dr STEVENS. (*New York Journal of Medicine*, September 1843.) The tumour in this case was seated over the upper part of the sacrum, was about three and a-half inches in diameter, and rose above the surface of the surrounding integument about two inches. The covering of the tumour was not healthy skin, but a peculiar thin membrane of a reddish colour traversed by numerous vessels like varicose capillary veins. The healthy integument formed a hard line at its point of union with the covering of the tumour. The tumour was punctured on the 17th, 20th, 21st, and 30th of October, with an iris knife, and from an ounce to four ounces of clear serous fluid escaped each time. The fluid was allowed to escape by drops—"at the rate of about three drops in a second;" about a third was, however, always left behind. The escape of the fluid generally produced a sinking of the anterior fontanelle of the skull, but no bad symptom followed. After the last tapping the child became fretful and slightly feverish, the sac of the tumour became inflamed, and the child was observed to keep her left leg drawn up, and cried when it was touched. Slight spasms of the muscles were also observed, and tendency to syncope whenever the head was raised. The tumour was kept wet with a spirit lotion, and gentle laxatives were given, the inflammatory symptoms abated, she returned to the country with her parents, and when seen two years after the operation, it was found that the fluid in the tumour had disappeared, and that a mass of indurated and corrugated integument covered the site of the tumour. The child was healthy.

Case of recovery from tearing off the arm at the Shoulder Joint by ma-

greatest of all the difficulties which belong to this difficult subject, and though the *onus probandi* should for many reasons lie with those who have made the affirmation, I shall not take shelter from this, the most arduous part of the task which I have proposed to myself, behind that standing rule of argumentation, because what I have to prove admits, I think, of proof of a very satisfactory kind. Thus, suppose we should find two fevers, strikingly dissimilar in many important characters, prevailing at the same time in a community, and both of them undeniably infectious, if we find in the case of persons infected with either, the disease, of which kind soever it may be, clearly traceable in each case to infection received from persons labouring under the same disease, like producing like, have we not just grounds for concluding that, though we cannot tell the qualities of the poisons, they must be essentially different? The dissimilarities in their effects, or in the diseases which they produce, will of course be the measure of their difference. If these effects be dissimilar only in unimportant and ever fluctuating particulars, it may, indeed, be replied that they amount only to such dissimilarities as may be readily ascribed to those variations in the poison, which, according to the hypotheses, are usual in the poison of continued fever, and that it is not at all wonderful that the varieties in the disease should be traceable each to individuals previously infected with that variety of the poison which alone is capable of producing it. But if, on the other hand, the dissimilarities in the effects should be of a description so very striking and considerable, that, according to all reasonable and acknowledged rules of nosology, the diseases cannot be deemed simply varieties of the same disorder, but most assuredly and essentially different diseases, then, from all that we know of the consistent action of poisons, we must conclude that the causes of those diseases are different. The evidence I conceive to be adduced in the sequel, of the difference between the characters of typhus and of the more prevalent epidemic fever, will establish this point; and here, I would only remark farther, that the want of a careful scrutiny of the causes of fevers, and of the laws of their propagation, in connection with a discriminating study of the more important differences in their symptoms and course, has been a chief source of the difficulty which has occurred in distinguishing them. It is in consequence of this double neglect that it has been a matter of mere opinion or whim, as to how far fevers are dependent on one poison, and as to the limits in the number and nature of the symptoms which may depend on one poison.

So much having been left unascertained, physicians have had no restraint in following their individual inclinations, either to subdivide fevers excessively, or to disregard seeming distinctions as unimportant. Hence, on the one hand, the numerous fevers admitted by Sydenham, as proper to different years, and epidemic constitutions, and the multitudinous diversities and denominations admitted by more modern writers, according as one or other of the

fever by the contagion of typhus. Dr Southwood Smith goes quite as far, virtually affirming that intermittent, remittent, typhus fever, and plague, all originate from different intensities of the same poison.

viscera happened to appear implicated. And hence, on the other hand, the extreme limitation of the genera of fever, by almost all our best writers, within the last thirty years; and the exceedingly vague notions, which are prevalent in regard both to the causes of fevers, and to their essential peculiarities.

Dr Bateman was a strenuous advocate of the unity of our continued fevers, and, although I hold views opposed to his on this point, I quote the following passage from his work on the Epidemic Fever of London, in 1810, and subsequent years, as expressing most correctly the many varieties which occur in typhus. "Its character is greatly varied, by the different circumstances in which it occurs, by the age, constitution, and previous health of the patient, by the intensity of the existing causes, by the situation and season, and by early neglect or mismanagement; but it is not more varied than other febrile diseases, the small-pox, for instance, or scarlet fever, under similar circumstances, and examples of the most distinct modification, which it undergoes are often observed in individuals of the same family. Thus, in the instance of a man and his wife, who were brought to the house of recovery together, the former was affected with the mildest symptoms of fever, which scarcely confined him to bed, and terminated in a speedy convalescence; while his wife was lying in a state of stupor, her skin covered with petechiæ and vibices; in a word, exhibiting the most formidable symptoms of the worst form of typhus. Yet these extreme degrees of the disease manifestly originated in the same cause; and it would be equally unphilosophical to account them different kinds of fever, and give them distinct generic appellations, as in cases of benign and confluent small-pox, which are generated in like manner from one contagion." Every one who has seen much of typhus fever must have met with many similar examples, proving the wide range which should be allowed, in the severity of the symptoms, to fever of that kind; and if degrees of severity of the symptoms were the only distinguishing features between the fever at present epidemic, and the less prevalent typhus, there can be no question that the attempt to distinguish them would be highly unphilosophical, because contrary to the analogy furnished by the examples of other diseases of whose identical nature in the extremes of mildness and severity there can be no doubt, and at variance with the testimony derived from the oneness of the source from which they have apparently sprung. But, by parity of reasoning, it would be highly unphilosophical to refuse to account those different kinds of fever, and to grant *them* different appellations, which differ widely, not in the degree, but in the nature of their symptoms, and which cannot be traced to one contagion, but in a very remarkable manner to two.

But it may be said, that undoubted examples of one and the same fever, of typhus, for instance, frequently differ not merely in the degree, or intensity, of their symptoms, but in the very nature of them; and, as I do not desire to overlook this difficulty in the attempt to distinguish the present epidemic fever, from typhus in any of its forms, I admit fully what is stated on this point in the

following passage from a report by Dr Cheyne on the typhus epidemic in Dublin, in the year 1818. "In a majority of the cases which at any time occupy a fever hospital, there are so many points of resemblance, that an experienced person may soon discover the character of the prevailing species of fever. * * * But in the present unsettled state of medical opinion, with respect to the essence of fever, what one would call typhus, or synochus, another might call a pituitous or bilious fever, and a third, according to some particular determination, might denominate gastric, pulmonic, or cephalic fever."—Dublin Hospital Reports, Vol. i. p. 13.

Symptoms connected with special disorder in one or in another of the viscera, are here referred to as accidental occurrences, in different cases, bestowing a character of individuality on each, without affecting their essential sameness as typhus fever. Every disease has its accidents, no two cases of the same having features precisely alike, and it is, perhaps, in a peculiar measure characteristic of typhus fever, that in different persons, at the same or at different periods of the year, and also in separate epidemics, local derangements may assume diverse forms, and may affect different viscera; while, notwithstanding, a residuary group of particulars remains common to all the cases, and serves to establish their identity as individuals of one peculiar disease. In the endeavour, therefore, to determine and to show that a real and fundamental distinction exists among fevers, it is necessary that accidental diversities should be carefully separated from essential characters, and this rule has been scrupulously attended to in regard to those points which I conceive to exhibit the most conclusively the broad distinction which should be made between the two diseases which are contrasted in the following pages. And, in order that I may not appear to have reached the conclusion, that they are essentially distinct diseases, without having duly ascertained what are the distinguishing peculiarities of each, and that the characters which I consider as such are really distinguishing peculiarities, and not mere accidents of a somewhat unusual kind, what I may state, that I have been led to deem the distinguishing peculiarities of typhus, as compared with the other fever, have been founded on a very careful study of that disease for seven years past, in, at a moderate estimate, from 1600 to 2000 cases. My opportunities of observing the present epidemic have, of course, been much less numerous; but its characters are so very unlike those which have appeared peculiar to the other disease, that my own less extensive observation of them is of little consequence, seeing that the same description of the disease, in some of its leading particulars, is given by every one who has seen much of it, and has observed it with discrimination.

It may be anticipated justly, that all the dissimilarities between the two fevers shall not be found equally important, shall not afford evidences of equal weight that the fevers are actually different in the full sense of the term. Some, therefore, I shall omit to notice, and shall call the attention of the society to those only which appear to be the most remarkable.

The present epidemic began to prevail in February last, and the very first cases which fell under my notice I distinguished, at once, as widely different from every fever that I had formerly seen. The first circumstance which struck me as remarkable, and unlike what I had witnessed in typhus fever, was the much greater frequency of the pulse in the new disease at an early period of its existence. We do not, in hospital practice, witness cases of typhus fever often before the eighth day of their duration, and still less frequently before the sixth, so that in looking over my case-books of typhus fever, so far as my time would permit, I have been able to discover only fifteen instances of admission into hospital on or before the fifth day. In reference to the comparison to be laid before the society, of the frequency of the pulse in the two diseases, it is necessary to limit it to the first five days of each; because, at the end of that period, the epidemic fever commonly terminated in its first convalescence or intermission. I find the average frequency of the pulse in the fifteen examples of typhus, observed on or before the fifth day of their duration, to be exactly 100 in the minute; while in thirty-eight cases of the epidemic fever, which became convalescent at the end of the fifth day, the average frequency is 123. I need scarcely remark, that these thirty-eight cases have not been selected; they composed all the cases terminating on the fifth day, of which I had taken daily reports up to the time at which the calculation was made. In the fifteen cases of typhus the frequency of the pulse exceeded 104 in only two instances; in the thirty eight cases of the epidemic fever it did so in thirty-seven; in the thirty-eighth it was 100 on the fifth day; but what frequency it had previously had is not known. In thirteen of the cases of typhus fever the pulse was at or below 104 in the first five days; in eight only of the thirty-eight was it below 120. The difference thus exhibited in exact terms between the two diseases, in regard to the early frequency of the pulse, justifies the impression which had been left on my mind, of the less amount of frequency usually noticed in the pulse in the early periods of typhus, before I had examined the case-books with the view of ascertaining the point more particularly, and also the general rule derived from that impression, which, at the outset of the epidemic, I stated to the pupils of the hospital as calculated to enable them to determine, at a very early period of our fevers, with something approaching to certainty, of what kind the fever would eventually prove to be, whether a short or a protracted one. But it is not only in reference to this point that a particular attention to the frequency of the pulse in the two diseases is of consequence. I think it furnishes, besides, some grounds for presuming that there must be a very important dissimilarity in the nature of the two diseases. For an extreme frequency of the pulse in the epidemic fever seems to be an occurrence warranting no apprehension of a fatal issue, and no anticipation of any greater severity in the other symptoms than in such cases as have a pulse twenty or thirty beats lower,—thus, I have known the pulse, in a considerable number of cases, amount to 140 or 145, on the second and third days of the fever, and yet the other symptoms of no peculiar seve-

rity, and the crisis on the fifth day take place as usual, whereas the only case in which the pulse, in the fifteen examples of typhus, exceeded 120 on the fifth day, died on the seventh, and in that instance it was 134 on the fifth day, and 144 on the sixth. Among the cases of the epidemic fever of which I have preserved daily reports, and which ended on the fifth or seventh day, amounting to fifty, I find nine in which the pulse exceeded 135, and of these one died; and among sixty-eight cases of typhus fever, not selected of course, I find thirteen in which the pulse exceeded 134, and of these five died, giving a proportion in the one set of cases of a mortality, in connection with an extreme frequency of the pulse, of about 11 per cent., in the other of about 38 per cent. A high frequency of the pulse is well known to practical men to be a very alarming symptom in typhus, perhaps one of the most alarming next to those which almost invariably proclaim approaching dissolution, and yet this significant symptom of danger in our more common epidemics has no special indication in the present fever; for the fatal example adverted to, as having occurred among the nine examples of the epidemic fever, was that of a very feeble and miserable-looking man, whose case may be considered peculiar, and unfit for comparison, even in average estimates, with the common order of cases. I have said above, that, in only eight among thirty-eight cases of the prevalent fever, was the pulse below 120 within the first five days, and, I may add here, that of four cases seen first on the second day of illness, (few having been admitted earlier,) one had a pulse beating 120, the second 132, the third 140, and the fourth 145; and of four cases seen first on the second day of a relapse, one had the pulse at 114, a second at 136, a third at 140, a fourth at 144. In other four cases seen within a few hours of the commencement of relapse, the pulse beat respectively 120, 128, 120, 120. None of these cases died; but in what case of typhus, presenting a similar state of the pulse at so early a period, would the experienced physician hope for recovery? In typhus fever, we have seen that the ratio of mortality among those whose pulse exceeded 134 was 38 per cent., and it is not unimportant to add, that that high rate of frequency in typhus occurred in every instance but one, on or later than the ninth day of the disease, and, as I have already said, the solitary instance in which it occurred earlier, ended fatally on the seventh day. If we add the four cases in which the pulse, in the second paroxysm of the epidemic fever, exceeded 135, to the nine previously noticed, we have a mortality in this disease connected (supposing it to have been so, in the same sense as in typhus, in the single case which has been mentioned,) with an extreme frequency of the pulse of 1 in 13 or less than 8 per cent. The comparison which I have now presented between the epidemic fever and typhus may be objected to on this ground, that the cases of typhus fever which have been referred to occurred previously to the appearance of the epidemic which prevails at present. But, on looking into the particulars of the few cases of typhus that have been under my care since February last, when the other fever began to appear, I find that

they presented the same general characters which I have ever noticed to distinguish typhus; and, indeed, I had been in the habit of pointing out to the students in the clinical wards, throughout the spring and summer, those distinguishing features of the pulse to which I have been referring. In two only of the fifteen cases of typhus fever which have come under my notice in that time, was the pulse very frequent at an unusually early period, in the one having been 132 on the ninth day, in the other 140 on the seventh, and in both instances a fatal result occurred.

Before leaving this part of the subject, I shall briefly notice the conclusion which I think may be fairly deduced from the particulars which have been stated. It is maintained, or was for some months after the appearance of the epidemic fever, and, indeed, at our last meeting in July, the opinion was expressed by several of the members, that this fever was merely a milder form of our usual typhus; and the opinion of its mildness was founded on the smallness of the mortality, and the shortness of the attacks. Now it seems to me irreconcilable with this doctrine that the so-called milder cases should differ so much from the more severe disease, that a symptom which in the latter is among the most unfavourable that is liable to happen, should in the former be an occurrence of little or no particular significance. Again, if the epidemic fever be a mild typhus, we should expect to find among the cases which presented the more ordinary and unequivocal signs of typhus, such as we have known it to exhibit for many years past, among which the exanthematous eruption is one of the most characteristic, some evidence of this tendency to a mitigated severity. No such evidence, however, occurs, as the society will agree with me in believing, when I state that of the fifteen cases of typhus fever with exanthematous eruption which have been under my care since February last, four have died—or a proportion exceeding I in 3½, more than double the mortality of the typhus with eruption, which happened in my hospital practice, when that disease was epidemic, for several years before the appearance of the present fever. I find, moreover, on referring to the journals of the fever cases during those years, that a considerable number of cases of a very mild nature, and short duration, without any eruption, were admitted into hospital from the same families that yielded the severe examples of the disease, and were probably, in very truth, mild cases of typhus, and that those cases did not present that frequency of the pulse which is so distinctive of the epidemic fever, but corresponded, in this particular, with the earlier history of the common cases of the fever with eruption.

The next particular in which the two diseases admit of being contrasted is the comparative rapidity of convalescence. In the typhus of former years, and in exanthematic cases of fever, or unequivocal typhus, of the last nine months, the decline of the disease has invariably, in my experience, been gradual from day to day, nearly a third of the whole duration of the febrile state having been usually consumed between the period when the fever began to amend

and that of its total cessation. In the epidemic fever, on the contrary, a few hours witness commonly the transition from a state of extreme febrile heat and frequency of the pulse, to that of complete freedom from every trace of fever. In the ordinary course of things, we find the individual, who, at one visit, presented a temperature of 104°, or 106°, and a pulse of 130 or more, at the next, if the term of his fever has arrived in the interval, with a temperature of 98°, and a pulse between 70 and 80. Nor is the critical discharge or secretion of the epidemic fever a less remarkable feature of difference between it and typhus. In a very few instances of typhus I have noticed a favourable change coincide with the occurrence of copious perspiration, but never a total cessation of the febrile state. In the great majority of instances, however, instead of copious perspiration coinciding in typhus, with symptoms of amendment, it happens that it ushers in, or accompanies, a state of hopeless prostration, stupor, hurried breathing, and increased frequency of the pulse. The exceptions to this, the usual course of events, when profuse perspiration occurs in typhus fever, have been among the cases which have come under my notice extremely rare. The most remarkable instance of exception which I have witnessed occurred in one of the sixty-eight cases of typhus already alluded to. On the thirteenth day of the disease this case presented a pulse beating 150 in the minute, (it had been 102 the day before,) much subsultus, an almost comatose condition, and the surface literally bathed in perspiration. I anticipated the usual event of such cases, and was surprised to find, next day, a considerable amendment. He had taken in the interval nine ounces of whisky and four of wine, his pulse had fallen to nearly 90, and his intelligence was in a great measure restored; yet, for five days after, the pulse ranged between 90 and 108, he continued to pass his stools in bed, and to be occasionally delirious. I have seen no other case of typhus with such profuse sweating as in this case, and it was not more copious than is common in the present epidemic, ultimately recover,—and even in this instance the protraction of the characteristic features of the disease for a good many days after the occurrence of the sweating constitutes a marked difference between it and the fever at present epidemic. Very few cases of the latter disease recover without a critical sweat, which, for the most part, is general and very copious, and though sweating occurs, in many of the cases, repeatedly in the course of the attack, the cessation of the disease for the time is, in a special manner, and almost invariably, accompanied by the sweating.

A fourth particular in which the typhus and the epidemic fever differ very remarkably, is in the propensity to relapse. The latter disease very rarely consists of but one attack of a continued febrile condition, and, indeed, so characteristic of the disease is it to present a succession of attacks with apyrexial intervals, that the term relapse is not less inappropriate to the repetition of the fever than if applied to the paroxysms of an intermittent. The first attack usually extends but to five days, sometimes to seven, in a small proportion of cases to nine; and now and then cases occur of con-

valescence on the intermediate days, but very rarely. The subsequent attacks are less regular on the whole in the periods which they observe, some terminating within twenty-four hours; some in even a few hours, the paroxysm consisting of chilly feelings, speedily issuing in a hot fit, and more or less copious perspiration, or of inconsiderable febrile excitement and perspiration without chilliness, in a word, of the irregularities which occasionally distinguish common intermittents. The greater number, however, of the recurrent attacks are not in any respect different from the first, have commonly much the same amount of intensity, and the same disposition to extend to five, seven, or nine days. This observation applies not only to a second attack, but to a third, a fourth, and sometimes even to a fifth. I have not, indeed, witnessed a third, a fourth, or a fifth attack extend to nine days, and only in two or three instances have I known a fourth or a fifth attack happen at all. The number affected with a third attack is more considerable, but not so much so as that in which only two attacks are experienced. Now it is surely no accidental and insignificant circumstance that in typhus fever nothing of the nature of relapse of the fever, properly speaking, or repetition of it within a short period, ever takes place. I have not met with a single instance in the large multitude of cases of typhus which have been under my charge; and in making this statement I am not giving utterance to a mere impression suggested for the first time since the present epidemic, with its very different disposition, might be supposed to have induced me to search my memory for what may have been the results of my experience in typhus. The statement rests on a deliberate investigation carried on for years on the very point in question, and one which I have been accustomed to express, as occasion required, in the course of my public teaching, long before the present epidemic made its appearance. Let me be understood as using the term relapse in its proper sense, as signifying a repetition of the same malady through which the subject of it has recently passed, and from which he is not yet entirely convalescent before he is overtaken by its return. In this sense it is that I maintain that typhus never relapses,—that of the many hundred cases of typhus which I have seen, not one solitary example has relapsed. Febrile attacks doubtless happen in persons convalescent from typhus, and febrile attacks of various sorts occur in persons who, shortly after they have recovered from them, become affected with typhus; but there is a very manifest difference between a mere succession of febrile diseases, and successive attacks of the same febrile disease. By neglecting an accurate diagnosis of the nature of the diseases which occur to them in wards set apart for the reception of cases of fever, physicians attached to hospitals very generally overlook this important feature of typhus, and, from witnessing in their patients successive attacks of a febrile character, they fall into the mistake of regarding relapses as no very uncommon circumstance in typhus fever. The mistake is not one of slight importance, but is of the utmost practical consequence, for it not unfrequently happens

that the febrile attack which follows typhus is due to some serious visceral inflammation, and the most unhappy consequences result when the new affection is regarded, and treated, as merely a relapse of the former disease, to the neglect of those measures which are needed to overcome the local affection on which it actually depends. Thus it is that latent pneumonia, or pleurisy, are overlooked, and mistaken for a relapse of the idiopathic fever, until the true state of the case is discovered when the body comes to be examined after death. It was not until I was engaged in drawing up this communication that I discovered that I had been anticipated in the announcement that typhus fever is not subject to relapse. Dr Perry, in his Observations on Continued Fever, as it occurred in the hospitals of Glasgow in 1831, while commenting on the whole number of patients treated by himself in a temporary hospital erected for the accommodation of cases of fever, observes, " Of this number (1145) there were nineteen relapses, averaging one in sixty; and I was particularly struck with the fact, that these relapses were almost altogether cases of true typhus, occurring in patients who were previously admitted, labouring under some local inflammatory affection, and who had caught the fever in the house, and were seized with it before being dismissed, or soon after leaving it,—not an instance having occurred of any one returning with fever who had previously undergone the disease. The incorrectness of calling these cases of relapse is quite manifest, as it was an entirely new disease; and if I am correct in the propositions I have laid down respecting fever, it is as absurd to talk of a relapse of typhus fever, as to talk of a relapse of small-pox or measles. When an increase of fever takes place after the crisis of typhus fever, it is owing to the existence of some other disease," (Edinburgh Medical and Surgical Journal, Vol. xlv. p. 64.) Dr Alexander P. Stewart, in his paper on the Nature and Pathology of Typhus, and Typhoid Fever, alluding to his experience of the typhus which prevailed so extensively in Glasgow within these few years past, expresses himself in the following words, " I have never, among thousands of cases, seen a single case of relapse, in the proper sense of the term, after the symptoms had begun to decline." (Edinburgh Medical and Surgical Journal, Vol. liv. p. 300.) And, in order to sustain the statement by a particular reference to the facts of such cases of fever as were carefully and minutely watched and examined throughout the course of the disease, he adduces the details, which bear upon the point in question, of 139 cases of the fever. Of this number 99 went through the usual stages of the increase and decline of the disease without local complications, and without any disorder having supervened on the regular and characteristic fever,—and 20 died at the height of the disease. In the remaining twenty cases local complications occurred of various descriptions, " the secondary affection generally declaring itself after a temporary amendment," —in other words, presenting that relation to the preceding disease, which has been usually considered characteristic of relapse. While endeavouring to impress the society with a truth so much opposed

tubuli of left kidney appeared to contain tuberculous matter; both kidneys enlarged; weight, 15½ ounces. Weight of the body, 93¾ pounds.

Case 545.—A servant, aged 24 years. Phthisis combined with ulceration of the intestines, disease of the kidneys, and apoplexy. Two years delicate since an attack of pneumonia; cough for six months; has lost flesh lately; pulse, 100; no hæmoptysis; sputa yellow; dulness under clavicles; cavernous breathing, and pectoriloquy; aphthæ on tongue. Inguinal hernia of old standing, on the right side. He had a fit of apoplexy, accompanied by convulsions, the day before his death, thirteen days after admission.

Head.—An apoplectic clot, size of a penny, in the superior and posterior part of the right cerebral hemisphere.

Chest.—Pleuritic adhesions of upper lobes of both lungs; tubercles in both, and tuberculous cavities in their apices, the largest one in the right, which also contained the most tubercles; weight, 29¼ ounces; left, 21½ ounces. Heart, 6½ ounces.

Abdomen.—Liver large, nutmeg, 55 ounces; kidneys large; cortical portion mottled of a yellow and gray colour, tubular portion natural; weight 15 ounces. Large intestines; the mucous membrane black, thickened and ulcerated. Weight of the body, 96 pounds.

Case 546.—A porter, aged 25 years. Nine months ill previous to admission; died one month after; sickness and vomiting for some days before death.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles throughout both lungs; cavities in their apices, only the anterior edges of each altogether free from disease; right, 36 ounces; left, 34 ounces. Heart, 6½ ounces.

Abdomen.—Venous hepatic congestion of the liver; weight, 61 ounces. Slight ecchymosis in the stomach; intestines not examined. Weight of the body, 79 pounds.

Case 547.—A stableman, aged 25 years. Phthisis accompanied with delirium, scrofula in brain and liver. Ill for two months previous to admission; he died twelve days after; delirium occurred one week before his death, and he became so violent, that he was removed to the insane ward.

Head.—A flat scrofulous tumour, size of a shilling, on the posterior portion of falx, between it and the right cerebral hemisphere.

Chest.—Tubercles in both lungs; a cavity in the apex of the right, some earthy matter in the apex of the left, and condensation of the surrounding structure; lungs together, 43½ ounces.

Abdomen.—Small scrofulous tubercles in the liver; weight, 59¼ ounces. Weight of the body, 89 pounds.

Case 548.—Aged 26 years. Phthisis combined with tubercular peritoneum, and *pleuro-pneumonia*. Expectoration streaked with blood; cough for twelve months previous to admission; six weeks under treatment.

Head—Brain exsanguineous.

Chest.—Pleuritic adhesions on both sides; tubercles in different stages scattered throughout both lungs, most advanced in their upper lobes; a small tuberculous cavity filled with purulent matter in upper lobe of left lung; pneumonia of the right lung, and some recent lymph on its surface; weight, 54 ounces; left, 48½ ounces. Heart, 7¾ ounces.

Abdomen.—Peritoneum studded with tubercles; liver large, 60½ ounces; kidneys, 10¼ ounces. Weight of the body, 93 pounds.

Case 549.—Aged 26 years. Not a patient in the Infirmary.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles general in both lungs, and cavities in their apices; right weighed 27¼ ounces; left, 28 ounces. Heart, 7 ounces

repetitions of the kind occur in typhus, while they are so common in the other disease, as to constitute one of its most remarkable characters. That the difference in this respect between the two is a highly important one, I do not suppose that any one can doubt, and when I add that the cases of true typhus, which have occurred among the same class of the population, and at the same seasons, as the other disease, have presented no such tendency to relapse, or repetition of fever, as the latter does, it will appear, I conceive, that the liability to repetition cannot be esteemed other than a distinctive feature of the one disorder, and the absence of such a liability, a distinctive feature of the other, and that neither is dependent on accidental deversities in the epidemic constitution, either of the atmosphere or of the population, by which the effects of one and the same poison might be presumed to be modified or altered.

Those who maintain that the poison is the same in the two forms of fever have, however, still one argument left. They may say that the differences in the effects may be owing to individual peculiarities in the persons who are infected. But what will they think of their argument, when they find the very same persons exhibiting the two forms of fever, within a very short time. I have ascertained this to have happened in nine instances, a small number, indeed, considered absolutely, but not a small number, when the relative infrequency of typhus is remembered. A woman, residing in No. 327, Canongate, and her daughter, had typhus fever in April and May, and became affected with the other form of fever in August; two of her sons had typhus in July, and the epidemic fever in September; a man under the care of Dr Alison, in the Royal Infirmary, in July, with typhus fever, became affected with the other form of fever before he had left the ward in August; a man had the epidemic form of fever, with two repetitions (three attacks,) in Glasgow, in June, and came under my care, in September, with typhus fever; a boy admitted into the Infirmary, with typhus fever, about the middle of October, had been discharged five weeks before, after having recovered from the epidemic fever; a nurse in the Infirmary, after having recovered from typhus fever, was three weeks again on duty, when she was laid up with the epidemic form. These facts are, I conceive, fatal to the argument, to which I have alluded; and they are, moreover, of no small consequence in respect to another point.

Dr Perry remarks, in the article already quoted, that no person who had been once under his care with typhus fever, in 1831, was readmitted into the hospital with a second attack, and it is universally acknowledged, among those who have had much to do with typhus, that one attack bestows immunity from the disease, for a long time at least, afterwards. I have myself seen no example of a repetition, or recurrence, of typhus during the persistence of the same epidemic, and epidemics of typhus usually last between two and three years. On inquiry, too, at a considerable number of persons who had been admitted into the Infirmary, with the epi-

demic fever, I have learnt that, though many of the older among them had been living in one or other of our large towns, during the periods of several epidemics of typhus, but a very small proportion of them had more than one attack of the disease, (allowing that they had formed an accurate opinion of their disease on every occasion,) and not one of them had had two attacks without an interval of several years. These facts surely afford a very strong presumption, at least, that the fevers which affected the nine persons, whose cases have been adduced, differing as these fevers do so much in their symptoms, cannot have been the work of the same poison, cannot have been the same disease. And, further, if they originated in these nine cases from the same poison, if that poison can produce two attacks of fever in the course of a few months or weeks, is it not a little curious that the attacks should be so very dissimilar in their symptoms? Why have we not witnessed a second attack of the fever like the first, if both own the same poison as their cause. When the first attack has had the symptoms of typhus the second has had those of the epidemic fever, and when the first has had the symptoms of the epidemic fever, the second has had those of typhus. An attack of the epidemic fever seems to have the same property as an attack of typhus; it bestows immunity for a considerable time from a recurrence, for neither those of my colleagues with whom I have communicated on this subject, nor I have yet witnessed an example of a recurrence of the epidemic fever, with its repeated paroxysms.* But neither does the typhus give protection from the epidemic fever, nor does this from the typhus,—a very significant hint that the diseases are not essentially the same.

From what has been stated in the foregoing pages, the society will probably anticipate that researches into the manner in which the two forms of fever are propagated should produce evidence, that they do not recognize a common origin,—that they are not propagated indifferently from the same sources of infection,—that the one will not produce the other. Before I enter on this part of the subject, allow me to remind the society of the difficulties which necessarily perplex the inquiry,—a measure which I propose not as an apology for insufficient and equivocal facts, but to bespeak a proper estimate of those which I have to offer. The principal difficulty lies in the circumstances, that the two forms of fever affect the same class of the community, and are encountered in the same localities. Those who know the manner in which the poor among us are crowded together in lodging houses, and, when families live apart, are thickly grouped in common stairs, and in the same flats, will expect to be told that some, at least, of the attempts to trace the most dissimilar diseases, which may prevail among them, to their separate sources of infection have been fruitless, and that others

* I have been told, that a recurrence of the epidemic fever of this year has been seen. It must, however, be very rare compared with the liability to that succession commented on above, and, admitting that there has been no mistake on the subject, it does not affect very materially the argument contained in the text, while it would exhibit still another difference between typhus and the prevailing fever.

have issued in apparently contradictory results. And those who know that typhus fever, like small-pox and other contagious diseases, often makes its appearance without there being any clue to the quarter from which it has proceeded, will not be surprised to find it spring up occasionally among families already invaded by another prevalent disease. If the consideration that is due to them be given to these circumstances, I entertain no doubt that the particulars which I have to communicate will appear to entitle me to take full advantage of Dr Bateman's virtual and very proper admission, that the sources of infectious diseases give important testimony in respect to their identity, or, of course, according to the nature of the facts, to their essential distinctness.

To afford support to the views of those who conceive the fevers to be the same, and to have the same cause, it would be necessary that the cases of typhus and of the epidemic fever should be found to spring up or to be mixed up together inextricably. Now, let us see how far this accords with the facts. Of 39 cases of typhus fever that have come to my knowledge, since February last, 20 of which have been seen by myself, the history has been carefully investigated either by myself personally or by Mr John Lee, to whose industry and intelligence I have been much indebted, in 29 instances; and in only four of the whole number were the circumstances of a kind to induce a suspicion that they might have been produced from the contagion of the epidemic fever. The one case was that of a young woman from Burt's Close in the Grassmarket, who was sent to the Infirmary from a lodging-house that had yielded many cases of the other fever. On inquiry at the lodging-house it was ascertained, however, that the girl had been wandering from house to house during the summer, and had lodged there less than a month before her admission to the Infirmary in September, at the date of which admission she had the eruption of typhus on the skin. The second case was that of a man, Henny, from 327, Canongate. He was taken ill with typhus early in September, at a time when the stair abounded in the other fever; and, eight days after his removal to the Infirmary, his wife became affected with the epidemic fever. It was found on inquiry, that typhus fever had been in the second flat below from March to July inclusive, and had begun there, as I shall notice immediately, before the epidemic fever made its appearance in the stair. The third case was that of a boy who was taken ill with typhus on the same day (about the middle of October,) that a lad who slept in the same bed with him became affected with the epidemic fever. The other members of the family and the boy himself had been, in the course of July and August, affected with the epidemic fever. The boy had been for several weeks in one of the fever wards of the Infirmary, and was discharged from it five weeks before his attack of typhus; and it is of consequence to notice that there were two cases of typhus in the ward while he was convalescing from the epidemic fever. The fourth was that of a night nurse in ward 13 of the Infirmary. She had come direct from the country to her situation in May, and, during the two months

that she acted as a nurse, there were many cases of the epidemic fever in the ward, but not one of typhus, and she had not seen any person ill with typhus. She had, however, been often employed in the common laundry of the house in washing the clothes of fever patients of every description. In the first of these four cases, then, it appears that there is no proof that the typhus fever arose from infection by the cases of epidemic fever existing at the time it occurred in the lodging-house, or from the same cause or causes as produced them, for the girl who was the subject of it had been wandering from one lodging-house to another, a few weeks before having taken up her residence in that from which she was removed to the Infirmary. The second case, which occurred early in September, it is very plain, may be traced as justly to communication with the members of the family affected with typhus in July, as to communication with those of the other families in the stair who were affected with the epidemic fever. The man himself did not acknowledge having seen any of that family in their own house, but he was liable to meet with some of them daily in the narrow stair conducting to their dwellings, after their convalescence. The third case was obviously exposed to the contagion of typhus in the Infirmary a short time before he became affected with that disease himself, and the circumstance of his previously having had the epidemic fever cannot be regarded, after the observations already made on such a succession of fevers, as unimportant in rendering it still more likely that his last illness did not spring from the same cause as his first, or as the fever with which his bed-fellow was seized. The fourth case, that of the nurse, who was employed in washing the clothes of fever patients, may be traced to the occupation in question,—a not uncommon source of infection with typhus. Indeed, in the same ward a laundry-woman, who had not attended on the sick, had died of typhus in the previous March. And what makes the case of the nurse still more probably traceable to that source of infection, and not to the patients affected with the epidemic fever, is, that she took the latter disease a few weeks after recovery from her attack of typhus.

Of the remaining twenty-five cases, one occurred in the vicinity of the canal, and, on inquiry, it was learnt that there was no fever of any kind in the stair from which it had been sent to the hospital, or in the immediate neighbourhood; and the man himself could not account for his illness by any known exposure to contagion. A second case came, in the course of November, to the Infirmary from a close in the Grassmarket, and it was ascertained that no case of fever of any kind had occurred previously in the family or in the stair, and that no exposure to infection was known to the individual affected. A third case was that of a woman from the Fishmarket Close, who came under my care, early in October, in the Infirmary. There were no cases of fever in the stair from which she came, excepting of the epidemic fever in one family on the side opposite to her dwelling, and on the second flat above. She had no acquaintance and no intercourse with the family. When I last inquired

about this woman's family and neighbours, six weeks after her illness began, those on the same flat with herself, in all four families, were well, and no new case of fever had occurred among them; but the epidemic fever had began to spread among the families above. Twenty-two cases remain to be noticed, and their history is of still more interest and importance than that of the others. It exhibits a succession of cases of typhus occurring in the same household, unmixed with the epidemic fever, and, in some instances, of typhus communicated from one household to another surrounded with the epidemic fever.

The first instances of the kind which I shall notice occurred in a family of the name of M'Donald, residing in No. 327, Canongate. Isabella M'Donald entered No. 7, a fever ward in the Infirmary, containing at the time cases of typhus, on the 7th of March. I find, from the records of the ward, that she was then affected with a slight attack of bronchitis, and that she was dismissed cured on the 10th of the same month. On the 15th, she became again ill at her own residence, and was readmitted into the same ward on the 21st, having remained seven days with her friends after the fever had begun. Her disease proved to be typhus fever, with the usual exanthematous eruption. She returned home cured on the 21st of April. Her sister, Mary, was received into the same ward on the 18th of April, with the same disease, and was discharged on the 13th of May. Mrs M'Donald, their mother, had the same fever in April, and was not well again till some time in May. One of her sons, aged thirteen, died in ward, No. 8, of typhus, in the latter part of June; and two other sons, eight and five years old, had the disease in July. The epidemic fever did not commence in the stair till June,—and in the months of August, September, and November, the surviving five members of the family, who had been affected with typhus, were seized with the epidemic fever, which was then abundant among the other families in the stair.

2d, A boy, Thomas Lynch, became affected with typhus fever, in a stair in Stevenlaw's Close, on the 29th of July. He was attended by Mr Lee, and the exanthematous eruption was ascertained to distinguish his disease. There had been nine cases of the epidemic fever in the stair previously, but none in the same house, which was occupied by eight individuals, two of whom were lodgers. On the 1st of August, James Lynch, also a boy, took the same disease. On the 26th of August, Daniel Brady, who was seen by Mr Lee lying in the bed with the two boys when they were ill with the fever, became affected with the disease, and was subsequently under Dr Alison's care in the Infirmary, where I had an opportunity of seeing him, and of ascertaining that he had typhus fever, with the usual eruption. On the 2d of October, a sister of Brady, also a lodger with the Lynches, began to complain, and was afterwards admitted into the Infirmary under the care of Dr Graham, who recognized her disease as typhus fever. No cases of the epidemic fever appeared among these people at this time, and when

they were last visited in November, no other individual had become affected with the typhus, and the epidemic fever had not yet attacked them. Among the other families in the stair, however, the latter disease had spread extensively, but without any examples of typhus.

3d. In a common stair in Kitchen's Court, a boy named Middleton became ill with typhus fever, distinguished by red spots on the skin, in March, and was confined to bed five weeks. Mrs Coppell, a next-door neighbour on the same flat, and who had often seen the boy in the course of his illness, took the same disease in April, and was confined to bed four weeks. After her illness ended, four of her children became successively the subjects of a continued fever of four or five weeks' duration, and one of them died. The mother of the boy Middleton was taken ill in June, lay seven weeks in bed, and was delirious and unconscious for a considerable time. About the end of June, a Mrs Small visited Mrs Coppell's children, and sat up with the child who died. This woman, who resided in a stair in Stevenlaw's Close, became affected with typhus about the beginning of July, and died of the disease in the Infirmary, on the 16th of that month. Early in August, her son John, who lived with her, was seized with the disease, and was admitted into the fever hospital, Surgeon Square, on the 17th of the month. His case was ascertained to be typhus, with eruption. Towards the end of October, a lad named Scrymgeour, who lodged with John Small after his return from the hospital, was taken ill, and came under my care in the Infirmary, with typhus fever, characterized by the ordinary eruption.

Now, the epidemic fever did not break out in the stair in Kitchen's Court till the end of October, at which time the cases of typhus had ceased for more than three months. And in the stair in Stevenlaw's Close, where the Smalls lived, though there were some cases of the epidemic fever in one or two families above and below, there was no case of it among the Smalls, nor in the only family that lived next door to them on the same flat, either at the time when the typhus existed among them, or several weeks afterwards, when my last inquiries were made on the subject.

4th. On the 4th of September, I found another night nurse of No. 13 labouring under typhus fever. She had been a constant attendant on the nurse whose case has been already noticed, and who had been taken ill with that disease on the 10th of July.

It appears from the foregoing particulars, that in not a single instance has the typhus fever presented itself in circumstances that warrant the opinion that it must have been produced by the contagion of the epidemic fever. The four cases which, without a particular knowledge of their history, might have led to such a conclusion, have been found to have occurred in circumstances that render it highly probable that the disease may have been caused by the contagion of typhus, or render this source quite as probable as the other. And of the twenty-five remaining cases, five could not be traced to contagion of any kind, and two of them appear to have

been the starting points of twelve cases of typhus, which happened in persons directly exposed to the contagion of that disease, and without any admixture of the epidemic fever. Lastly, six cases in one family have been traced to infection received from the Infirmary, and one, the case of the second night nurse of No. 13, to infection from the first night nurse. Ten cases of the whole thirty-nine were not inquired after particularly, and nothing more is known of them than what was learnt in the Infirmary; yet the particulars thus ascertained are not without interest. A Mrs Garrot, who was under my care with typhus in August, lost her husband by the same disease a short time previously, in one of Dr Craigie's wards, and had two of her children at the time of her own illness under his care. One of the children I ascertained to have had typhus, but I could get no account of the other. A Mrs Bartie and her daughter were both under my care with typhus in April in the Infirmary, and it was reported that other members of the family had the same fever, but I could not learn particulars of them. A man named Bell was also under my care in the Infirmary with typhus, and his son was, about the same time, ill with the same disease in one of Dr Craigie's wards.

This paper, the object of which is to show that typhus fever and the epidemic fever are essentially different diseases, may appear to some as labouring to prove what none are now inclined to deny. The symptoms of the two diseases have been so generally recognized as strikingly unlike, that I believe there are very few who entertain any doubt that they are, to a certain extent, different affections. The very common people have not been insensible to their dissimilarities, and have been accustomed to speak of the typhus and the prevalent fever as distinct diseases. But though the more prominent features of their difference have appeared to be thus easily recognized, I apprehend that a deliberate investigation into the amount and constancy of the differences has not been without its use. Every one knows that an apparent difference among diseases, however remarkable, does not necessarily spring from an essential and actual difference in their nature, and though many among us, on the ground of those more striking characters which have served to mark the epidemic fever, even in the estimation of the poor, who are the principal subjects of it, as a distinct disease, may have latterly avowed the confident opinion, that it differs widely from typhus, I venture to submit, that little weight is due to that opinion, unless those who entertain it are able to furnish other evidences of the difference, than vague and general impressions of a greater or less liability to this or that symptom in the one compared with the other. If I had been able to show nothing more than what involved *degrees* of liability to particular symptoms as the proofs of a difference between these fevers, I should feel compelled to consider the proof miserably defective. If, for instance, the question at issue were, whether the typhus or the epidemic fever relapsed the more frequently, or whether the typhus or the epidemic fever were more liable to end suddenly in a critical sweat, and so forth, I conceive there could be no-

thing like satisfactory proof that the fevers were not accidental varieties of essentially the same disease,—varieties dependent, it might be, on epidemic constitutions of the atmosphere, or of the people, which are deemed the causes of many important differences among the epidemics of other diseases,—and which seem to give a greater prominence to one symptom or to another at different times. The particulars, however, which have been stated, prove that there is much more than differences of this sort observable between the two diseases,—that the one is distinguished by highly important characters, which are not found to occur in the other, and that the one is not capable of producing the other. And if, notwithstanding, it be still maintained that the two diseases are due to modifications of the same poison, the modifications must be admitted to be of a kind that produces effects quite as peculiar to each, and as dissimilar as if the poisons were entirely different.

I have not thought it proper to refer particularly to the absence, in the epidemic fever, of the exanthematous spots which are so common in typhus, as affording a ground for distinguishing them, because the latter disease does not always exhibit them in any epidemic, and appears much more subject to them in some epidemics than in others. Nor do I attach the same importance to the circumstances I am to notice next, as to those which I have already specified, though the practical and pathological interest belonging to them prevent me from withholding them from the Society on the present occasion. I allude to the affections of the spleen, of the urinary and biliary secretions, and of the blood, which have been noticed in the epidemic fever, and the reasons why I do not dwell upon these, as additional grounds of distinction between typhus and the epidemic fever, are, that jaundice has been sometimes noticed in true typhus, and that I am not prepared to maintain that the acute disease of the spleen, the functional disorder of the kidneys, and the morbid condition of the blood, do not occur in typhus. The jaundice, arising from the disorder of the liver, has made this to have been easily and often recognized in the course of the present eruption of this epidemic fever, as well as in several of those of the same disease which have been more or less fully described in former times. But I am not aware that the splenic affection, or the still more important disorder of the kidneys, had been noticed to occur in this fever, until after I had made them known, both in public and private, in the course of the past summer and autumn.

I am not prepared to say in what proportion of cases the disease of the spleen is apt to occur, because the pressure of many avocations has prevented me from examining with the necessary care a great many of the persons who complained of pain in the epigastrium and hypochondria, and obliged me to be satisfied with prescribing such remedies as have been found to be the most serviceable in relieving those local sufferings. I examined, indeed, a good many persons who made complaints of pain in the left hypochondrium, without finding any decisive evidence of the spleen being affected; but in twelve instances I did detect the organ in a state of disease.

In some of them the spleen was so much enlarged as to have been easily distinguished projecting beyond the lower and anterior margin of the hypochondrium; in others the enlargement was discovered by percussion only, but the results of this method of examining were not less satisfactory and conclusive than those occasionally afforded by manual examination below the margin of the hypochondrium. By one or both of those expedients, the spleen was discovered, in the twelve examples referred to, to have become greatly enlarged. In some instances the dulness of the percussion sound extended nine inches horizontally, between the spine and the epigastrium, and between five and six inches perpendicularly, so that I am within the mark when I presume that the organ, if equally enlarged in thickness, must have increased to four or five times its ordinary size. In other cases, the extended dulness was less—for the most part seven inches by four or four and a-half;—the natural extent of the dulness averages about three and a-half inches by three or two and a-half. That the enlargement of the spleen in these twelve cases was not the result of ancient organic disease was abundantly evident, from the usually rapid decrease which followed leeching the hypochondrium, and the other remedies which were used. In some cases the affection occurred during the existence of a paroxysm of the fever; in others it happened after the paroxysm was over, and was ushered in and accompanied by a proper symptomatic fever, differing from a paroxysm of the epidemic fever in this, among other circumstances, that it yielded speedily to the local remedies which were addressed to the disease of the spleen, and subsided along with the latter. When the enlargement of the spleen took place during a paroxysm of the epidemic fever, it did not subside when the latter terminated, so that the treatment of the splenic disease was for the most part the business of the intervals between the paroxysms. None of the cases terminated fatally, and I cannot therefore give an account of the changes of structure or aspect which the spleen may have undergone, yet, that the disease was truly inflammatory, the great degree of pain and tenderness which accompanied it, and the occasional development of a symptomatic fever, distinct from the epidemic fever, and unlike it in several important particulars, appear sufficiently to attest.

It was not till August that I began to entertain a suspicion that the function of the kidneys was liable to be affected to an extent that was capable of producing the most serious consequences. The suspicion was suggested by the following circumstances. A patient of mine in the hospital, two or three days after the crisis of a paroxysm of fever, was seized with convulsions; and my friend Dr Moir informed me that, in a family which he attended, two members were seized, also after a paroxysm of fever had ceased, with convulsions, and that one of them died in the convulsive state. In none of these cases was there jaundice to account for the attacks of convulsion. In October, I was requested to see a young gentleman who had had the crisis of his first attack of the fever the day before. When I saw him at noon, his respirations were reduced to

twelve in the minute, and his pulse to 58; he was very languid and oppressed, and had transient attacks of confusion of mind, and a peculiarly uneasy sensation in the head. As he had no jaundice, I inquired into the state of his urine, and learnt that he had passed none since seven the previous evening, and it was since that time that the symptoms I have mentioned had come on. He was directed to have ten grains of nitre every hour till three doses should be taken. Whether in consequence of the medicine or not, he passed some water half-an hour after the first dose, and, repeatedly, considerable quantities in the course of the day and succeeding night, so that at seven next morning he was found to have passed altogether at least four pounds of urine. He was much relieved by the evening of the day on which I had seen him first; his pulse had risen to 72, and his uneasiness in the head and tendency to delirium had ceased. Next day he was perfectly free from every unpleasant symptom. This last case determined me to pay more attention to the condition of the urine in future, and it was not long before an opportunity occurred of making more particular researches on the subject than I had previously done, and of having the suspicion I have mentioned amply confirmed.

A man, Peter Don, aged 57, was attacked with the usual symptoms of the epidemic fever on the 6th of November. He had his critical sweat on the night of the 11th, and continued to perspire pretty freely till 8 o'clock on the morning of the 12th. In the afternoon of that day he began to get yellow, and at the hour of visit on the 13th his yellowness was general and pretty deep. There was some tenderness in the epigastrium. His pulse was 90; temperature moderate; bowels rather loose, and tongue dry. He had a little epistaxis in the morning; had made some water just before the visit.

Hirud. viii. *epigastrio, et hora somni Calomelanos,* gr. iv. *Pulv. Doveri,* gr. v.; *et cras mane Pulv. Rhei,* gr. xviii.

14th. One stool; no urine since visit yesterday, excepting a little passed at stool; no distension of the hypogastrium; lies quietly, and has an appearance of oppression, and somewhat of stupidity; pulse 96, feeble; skin cool; respirations 18; pupils contracted; some frontal headach.

℞ *Potas. Acet.* ʒii.; *Aquæ Fontis* ℥xii. *S.* ʒii. 2*dis. horis.*
H. *Vin. Rubri* ʒiv.

15th. Urine reckoned at ℥xviii. of which fourteen have been preserved; the rest was passed with a stool; pulse 84, of better strength; tongue moist and cleaning; yellowness as before; less oppression and stupidity at present.

Cont. Sol. Acet. Pot.; Vespere Calomelanos gr. v. *Pulv. Rhei,* gr. vi.

16th. Has had a consistent stool, which has been mingled with the urine; the latter is abundant and of dark colour, not coagulable by nitric acid, but gives a greenish hue; tongue dry; sordes on the lips; tendency to trembling; is sensible but distressed looking; pulse 84, small and soft.

H. *Vin. Rubr.* ℥viii. *Inj. Enema dom.*

17th. Pulse 96, feeble; one scanty dark stool. Has repeatedly passed some urine in bed; and eight ounces besides, which have been preserved; its specific gravity 1020; respirations 12; much tendency to stupor; yellowness as before. Had a convulsive fit yesterday evening at eight. Is affected from time to time with starting of the upper limbs.

℞ *Pulv. Jalap* gr. xv.; *Calomelanos* gr. v.; M.; *Empl. vesicat. capiti; Vin. Rub.* ℥x.

18th. Died at 4 A. M., and had several convulsive attacks previously.

Dissection, 20th.—Liver contains a moderate quantity of blood, and is otherwise of natural appearance; a good quantity of consistent brownish bile in the gall-bladder. Spleen weighs twelve ounces, is fleshy, and exhibits marks of old inflammation on the surface in the form of white patches. The vascularity and consistence of the brain present nothing remarkable. The kidneys are of ordinary size and consistence, moderately loaded with blood, and when washed seemingly a little paler than usual in some places, but there is no appearance of deposition. The bladder is full of urine of natural colour or rather yellower.

Three drachms of serum were contained in the ventricles of the brain. These, and some clots of blood from the heart, were sent to Dr D. M'Lagan, who had kindly promised to ascertain whether or not urea could be discovered in them.

Crystals of nitrate of urea were obtained in moderate abundance from the serum of the brain, and a very considerable quantity from the blood.

Soon after this case occurred, another attracted my notice, as exhibiting certain symptoms which, though far from being intense, or such as occasioned the smallest degree of apprehension that they foreboded an unfavourable event, induced me to seek for an explanation of them in the state of the blood. The following is an abstract of the daily reports.

William Cameron, aged 30, was admitted into the Infirmary on the 24th of November. He had been ill since the 20th, and on the evening of his admission had had his critical sweat. It was not till the 28th that particular notice was taken of him again, as he appeared to be going on well. On that day it was reported of him that he had continued free from fever since the 25th, and that his urine amounted to thirty-six ounces.

Report of the 29th. Has passed twenty-two ounces of urine; it is deeply coloured, but without sediment. He has been ever since his critical sweat occurred in a somewhat dull, heavy state; and when questioned particularly to-day, says that he has a sense of weight in the head and drowsiness. His respirations are twenty in the minute; skin cool; and pulse moderate in every respect.

Ht. Sulph. Quininæ, gr. iv. *8va quaque hora.*

30th. He is still affected with the sense of weight in the head, some feeling of confusion and languor, but is quite intelligent; his pulse is 72, full and soft; has passed sixteen ounces of urine, be-

sides a little at stool; its sp. gr. is 1025, it is very turbid, becomes clear on being heated, and does not coagulate by heat or nitric acid.

Three ounces of blood were taken from his arm, in order to ascertain if urea existed in it. Dr M'Lagan submitted it to the usual tests, and obtained a very small quantity of crystals of urea, yet enough to satisfy himself and Dr Tilley that they were crystals of urea. The urine passed on the same day that he was bled yielded abundant crystallization with nitric acid, and without having been previously evaporated.

After the 30th of November, though no other treatment was adopted, the case went on improving. The urine increased gradually to above twenty-six ounces, and retained its high density. He had a repetition of the fever on the 4th of December, and continues at present affected with it. His urine to-day exceeds thirty ounces.

What is particularly interesting in these two cases is, that the urea seems to have accumulated rapidly in the blood, notwithstanding that the urine had never become suppressed, and in the second case had not become reduced, for more than two days, much below its natural amount. In Bright's disease of the kidney, it is stated by a high authority, that urea can seldom be detected in the blood, unless the quantity of the urine for some time does not exceed one-third of its usual amount, and in that disease it is to be remembered that the accumulation is favoured not by the decrease in the quantity of the fluid merely, but also in the proportion of urea which it contains. If we take these facts into consideration, and remember, at the same time, how many cases there occur of diseases of the heart, for example, in which the urine does not exceed fifteen or sixteen ounces for weeks together, without any symptoms occurring of urea having accumulated in the blood, we can scarcely avoid the conclusion that, in the cases which have been detailed above, the urea must have been generated in unusual abundance before the urine had decreased in quantity, otherwise we cannot account for its having become so speedily capable of being detected in the blood. If, as Liebig avers, the formation of urea is always in proportion to the amount of action going on in the system, we can understand how a temporary interruption to its being freely eliminated should be the cause of its accumulation in the blood in the short space of time that seems to have been sufficient in the cases in question; and I do not see how the accumulation of the urea can have happened, unless there have been an undue generation of it in the course of the fever, as well as some interruption to its being freely discharged afterwards. That the latter has much to do with the accumulation in such quantity as to enable the chemist to detect the substance in the blood I do not doubt, for it is only after the urine has decreased that the symptoms produced by urea in the blood become apparent. And it is a fact worthy of particular notice, that it is not while the fever exists that the symptoms in question appear, or that the urine becomes diminished. I have paid a good deal of attention of late to the quantity of the urine in the course of the fever, and I have always found it copious and in a considerable number of cases that had expe-

rienced the crisis, and had not afterwards shown any symptoms of the presence of urea in the blood, the urine has always been found abundant, that is, between three and four pounds, and in some instances five.* Whether it is the excessive action of the sudoriparous organs at the period of the crisis or not that affects the amount of secretion from the kidneys, I do not venture to say, but it is certainly in the interval of the paroxysms, or after they are over, that the urine becomes decreased, and that the symptoms of cerebral disorder, such as are known to be liable to follow the accumulation of urea in the blood, are witnessed. These symptoms I had remarked, though without suspecting their cause until latterly, from a very early period of the epidemic, and now that urea has been detected in the blood in cases which exhibited the same class of symptoms, (though in the one instance with more than the usual intensity,) I cannot doubt that, in the several instances to which I have adverted as having first excited my suspicions on the subject, and in many other cases which presented a less considerable degree of the same kind of phenomena, the presence and poisonous action of urea have been the causes of the peculiarities which they displayed. That recovery should have taken place spontaneously in almost all of them, proves that the accumulation of the urea is a less serious evil than might have been anticipated; but that the accumulation is, notwithstanding, a very important event, in a practical sense, will appear further from the few remarks I have yet to make.

I have adverted to the jaundice, which is apt to occur in the course of the fever, and was once inclined to regard it as a very formidable symptom. I am in a condition to assert now, however, that there is no proof that the jaundice is of any consequence,—no proof that the jaundice has caused those symptoms of cerebral disorder which have been ascribed to it, or has produced a fatal event, in a single instance. One of the cases which I have detailed was a case of jaundice, and if the blood had not been examined, the death would have been ascribed in that instance, as it has been in not a few others, to the jaundice. Henceforth, before any one can assert that he has lost a case of this fever from jaundice, he must be prepared to show that there was no urea in the blood. The examples of complete jaundice which have come under my care have amounted only to six. Five of them had not a single symptom that made them differ from the ordinary cases, excepting the yellowness, and that was as deep as in the fatal case in which the jaundice and the accumulation of urea occurred together. It will, therefore, be no small advantage if the facts which I have been able to determine respecting the latter, shall teach us to enquire carefully into the state of the urine at that period of the disease during which the vigilance of the physician has usually become relaxed, from the supposition that it was no longer necessary, and more especially in such cases of jaundice as present symptoms of cerebral disorder, for in these circumstances it appears that our calomel, our cupping, leeching, and blistering the right hypochondrium, should give place to the remedies which act upon the kidneys.

* Cameron, still in the second paroxysm of his fever, passed on the 7th sixty ounces of urine.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY AND PHYSIOLOGY.

On the Structure of the Intestinal Villi. By M. LACAUCHIE. (*Comptes Rendus des Seances de l'Academie des Sciences*, 22d May 1843.)—M. Lacauchie examined with care the intestinal villi as soon after death as possible. He found them to be then the seat of contractions, due to the action of the chyliferous vessels which contribute to form them. These fasciculi possess a muscular action, and each villus is a system of sucking pumps, there being as many pumps as there are canals in its central part. The vascular net-work of blood-vessels does not contribute to the absorption of the chyle, but serves solely for the nutrition of the organ. The villus is enveloped by a spongy substance, which prevents the chyliferous vessels from coming into immediate contact with the intestinal fluid; it is through this spongy substance that the canals draw the chyle, ready formed in the intestinal cavity.

Experiments on the direct communication of the Pulmonary Air Vesicles with the Pulmonary Veins. By Professor HORNER, of Pennsylvania. (*American Journal of the Medical Sciences*, April 1843.)—That the air vesicles appear to communicate directly with the pulmonary veins was accidentally discovered by Professor Horner when preparing lungs for anatomical purposes. He had removed a healthy pair of lungs, from a lad of 19, fixed a pipe into the trachea, and permitted a column of water, to pass gently into the air cells. The lungs soon filled completely, and he was not a little astonished to find that the left side of the heart also became distended with water, and poured out water freely from the cut branches of the aorta. No water, however, flowed from the pulmonary arteries, or found its way to the right side of the heart. Every time this experiment was tried with the lungs, they gave the same results; the water found its way into the left side of the heart, and flowed freely from the aorta.

The same experiment was repeated on the healthy lungs of a young man, who died in consequence of a railway accident. The left side of the heart readily filled with water, which escaped freely from the cut branches of the aorta. The pulmonary artery, or right side of the heart, did not at first fill, but after a while, water also flowed from them, but in no quantity as compared with what flowed from the aortic orifices.

A third experiment was made on the lungs of a Malay, who had committed suicide, by cutting across the external carotid artery. The lungs were perfectly sound, and when treated by water as above, it was found that in a very little time, the water was returned in a full stream, by the pulmonary veins. A very small quantity only passed by the pulmonary arteries, only enough to come away in a very slow manner by drops. On

repeating several times the experiment with the same lungs, it was found that the water on each trial came away less rapidly, than at the beginning, for when the lungs became infiltrated with water, the communication between the air vesicles and the pulmonary veins seemed to become less free.

The lungs of a hog, of a sheep and of a calf, failed to exhibit any such communication. But when the lungs of a calf and a sheep were obtained from a Jew butcher—lungs thoroughly drained of blood, the experiments succeeded, as in the lungs of man, in showing a communication between the air vesicles and pulmonary veins.

The next series of experiments was conducted with the view of proving that the water did not get access to the pulmonary veins by simple infiltration, but by some direct communication. Had it been by simple infiltration, the water would have distended the cellular tissue, and when the pressure of the column of water was withdrawn, the lungs would not have returned to their usual size, but have remained œdematous. In all the experiments, however, when carefully conducted, the lungs fell to their usual size, when deprived of the water. Further experiments were performed, in which the residuary air of the pulmonary vesicles, by the force of a column of water, was driven from the lungs into the pulmonary blood-vessels. All the cut vessels having had ligatures thrown around them, it was found that the pulmonary artery became distended with the condensed air, so as to give it a tension and elasticity like that of an inflated intestine. With this state of things, there was no emphysema of the lungs, which would inevitably have resulted, had there not been a direct communication between the air vesicles, and the pulmonary vessels. In the same lungs, the water, when allowed to pass through them, was evacuated in a full stream, by the pulmonary arteries, as well as by the branches of the aorta.

In the next experiment, the lungs were previously distended with air, by a column of water acting on a reservoir of air. The air was found to pass readily to the heart, by both pulmonary veins and arteries, but especially by the latter. When the water itself was admitted, it readily found an exit in a full stream from both pulmonary arteries and veins.

Professor Horner deems these experiments conclusive as to the existence of a direct communication, by pores which must be exceedingly fine, between the air vesicles and the pulmonary vessels, and that they serve to explain the occurrence of air which is almost constantly found in the heart and blood vessels after death.

On Muscular Electricity. By M. Matteucci. (*Annales des Sciences Naturelles*, August 1843.)—M. Matteucci, in a long and elaborate experimental paper, has succeeded in proving that muscles, while in life, and for a short time after death, exhibit distinct currents of electricity. By cutting the thighs of frogs in halves, and laying them in contact, so as to form a pile, he succeeded in obtaining very distinct indications of the presence of the electrical current, and found that that current was invariably directed from the interior to the exterior or surface of the muscle. The electrical current was developed by the muscles of all living or newly killed animals, was most powerful in those highest in the scale of creation, and was quite independent of any nervous agency, being equally developed, whether the nerves were entire or destroyed. Indeed, in the course of his experiments, he found, as Bischoff and others had previously proved, that nerves are very feeble conductors of electricity. This last observation is the more valuable, coming from M. Matteucci, as in some of his former papers, he endeavoured to prove nerves to be conductors of electricity, and felt, in consequence, inclined to regard the nervous influence as allied to the galvanic or electrical principle.

Influence of Menstruation on the Secretion of Milk in Nurses. By M. RACIBORSKI. (*Journal de Pharmacie*, August 1843.)—M. Raciborski, in a memoir lately read to the Academy of Medicine, has sought to establish, by a collection of facts, the influence of menstruation on the general health of nurses and on the secretion of milk. The medical profession has been very much divided on this point; for whilst some think that menstruation does not injure the quality of the milk, and, of course, ought not to be regarded as a reason for a woman ceasing to nurse, others consider the occurrence of menstruation as hurtful to the quality of the milk, and will not permit a woman to nurse in whom the menses are flowing.

M. Raciborski examined with care the milk of seven nurses both during the intervals between menstruation and whilst that flux flowed. He examined its general appearance, its chemical reaction, its density, the relative amount of cream, the microscopic appearance of the globules, their number, diameter, and mode of arrangement, and compared these with the milk of an equal number of nurses who had not menstruated; and, lastly, he inquired minutely into the state of health of the children who sucked the nurses who menstruated. The general conclusions were;

1. Contrary to what has been lately averred, the milk of nurses who menstruate whilst nursing does not appear to differ in its physical quality, in its chemical reactions, or microscopic appearance, from the milk of nurses who have not menstruated.

2. The only peculiarity which it seems to present itself is, that, in most cases, it is less rich in cream during the continuance of the menstrual evacuation than during the intervals between that flux; and it is to this peculiarity that the bluish aspect of the milk, observed in some cases, ought to be attributed.

3. In respect of the influence of the mother's milk on the infant during menstruation, its supposed inconveniences have been much exaggerated; and a nurse ought never, in any case, to be rejected simply because she continues to menstruate.

CHEMICAL PHYSICS.

Proposals for a New Scale for the graduating of Thermometers. By THOMAS STRATTON, M. D., Edinburgh; Hon. Memb. Highland Soc. of Canada. (*In a Letter to* Sir GEORGE BALLINGALL, M. D.)—In forming his scale Fahrenheit took as its commencement thirty-two degrees below the freezing of water, and then, finding that there were greater degrees of cold, he continued a series of descending degrees below zero; in temperate countries such as Britian, little inconvenience is occasioned by this defect in the scale, as the temperature is seldom below zero, but in other lands, as Canada, Russia, &c. the thermometer is often below it, and this imperfection in the graduating of the instrument produces very great inconvenience and often errors in accounts of the temperature. In copying meteorological accounts, if the sign *minus* be omitted, great mistakes are the result; and, in taking the mean of two degrees one above and the other below zero, more trouble is given than would be required if a slight improvement were made in the scale.

The space between the freezing and the boiling of water is divided by the Centigrade scale into one hundred, and by Reaumur into eighty degrees, but these two plans are open to the same objection as that of Fahrenheit,—that two systems of numeration are required one above and the other below that imaginary point called zero. The actual number of degrees is perhaps of less consequence than the selection of suitable limits for the scale, the boundaries of which there appears no necessity to confine to the characteristics of water; and I propose to take as its commencement the freezing of mercury, and as its other limit the boiling of water, and to divide the in-

terval into a certain number of degrees which may be arbitrary, but, for convenience, might be 252.

Mercury freezes at forty degrees (more correctly. 39° 5″) *minus* of Fahrenheit, and the new scale might begin at 0 equal to *minus* 40° Fahrenheit; its 40° would be zero of Fahrenheit; its freezing point of water 72°, equal to 32° Fahrenheit; and its boiling point of water 252°, equal to 212° Fahrenheit.

I shall now give a comparative view of the two scales with the rules for mutually converting them.

Fahrenheit.	Prop. Scale.	Fahrenheit.	Prop. Scale.	Fahrenheit.	Prop. Scale.	Fahrenheit.	Prop. Scale.
212°	252°*	169°	209°	126°	166°	83°	123°
211	251	168	208	125	165	82	122
210	250	167	207	124	164	81	121
209	249	166	106	123	163	80	120
208	248	165	105	122	162	79	119
207	247	164	204	121	161	78	118
206	246	163	203	120	160	77	117
205	245	162	202	119	159	76	116
204	244	161	201	118	158	75	115
203	243	160	200	117	157	74	114
202	242	159	199	116	156	73	113
201	241	158	198	115	155	72	112
200	240	157	197	114	154	71	111
199	239	156	196	113	153	70	110
198	238	155	195	112	152	69	109
197	237	154	194	111	151	68	108
196	236	153	193	110	150	67	107
195	235	152	192	109	149	66	106
194	234	151	191	108	148	65	105
193	233	150	190	107	147	64	104
192	232	149	189	106	146	63	103
191	231	148	188	105	145	62	102
190	230	147	187	104	144	61	101
189	229	146	186	103	143	60	100
188	228	145	185	102	142	59	99
187	227	144	184	101	141	58	98
186	226	143	183	100	140	57	97
185	225	142	182	99	139	56	96
184	224	141	181	98	138	55	95
183	223	140	180	97	137	54	94
182	222	139	179	96	136	53	93
181	221	138	178	95	135	52	92
180	220	137	177	94	134	51	91
179	219	136	176	93	133	50	90
178	218	135	175	92	132	49	89
177	217	134	174	91	131	48	88
176	216	133	173	90	130	47	87
175	215	132	172	89	129	46	86
174	214	131	171	88	128	45	85
173	213	130	170	87	127	44	84
172	212	129	169	86	126	43	83
171	211	128	168	85	125	42	82
170	210	127	167	84	124	41	81

* Boiling point of water.

Fahrenheit.	Prop. Scale.	Fahrenheit.	Prop. Scale.	Fahrenheit.	Prop. Scale.	Fahrenheit.	Prop. Scale.
40	80	19	59	Minus 1	39	21	19
39	79	18	58	2	38	22	18
38	78	17	57	3	37	23	17
37	77	16	56	4	36	24	16
36	76	15	55	5	35	25	15
35	75	14	54	6	34	26	14
34	74	13	53	7	33	27	13
33	73	12	52	8	32	28	12
32	72*	11	51	9	31	29	11
31	71	10	50	10	30	30	10
30	70	9	49	11	29	31	9
29	69	8	48	12	28	32	8
28	68	7	47	13	27	33	7
27	67	6	46	14	26	34	6
26	66	5	45	15	25	35	5
25	65	4	44	16	24	36	4
24	64	3	43	17	23	37	3
23	63	2	42	18	22	38	2
22	62	1	41	19	21	39	1
21	61	Zero	40	20	20	40	Zero†
20	60						

Rules for converting the one scale to the other.

1. To turn Fahrenheit's into the new scale.
   α. To any degree above zero, F., add 40°.
   β. For any degree below zero, F., subtract the degree of F. from 40°.
2. To change the new scale to Fahrenheit's.
   α. From any degree above 40° subtract 40°.
   β. For any degree below 40°, subtract the degree from 40°.

Kingston, Canada,
June 1843.

MEDICAL PATHOLOGY.

The Microscopic Parasite of the Sebaceous Sacs and Hair-Follicles of the Human Skin. (From Mr Owen's *Lectures on the Comparative Anatomy and Physiology of the Invertebrate Animals.* London, 1843.)—The microscopic parasite of the sebaceous sacs and hair-follicles of the human skin, lately discovered by Dr Simon of Berlin, and described in Müller's Archiv. für Physiologie (1842, p. 218. pl. xi.), represents the lowest organised form of the class *Arachnida*, and, like the parasitic *Cymothoe* and *Bopyrus* of the Crustaceous class, makes a transition from the Anellides to the higher Articulata. In length, it ranges from one fiftieth to one hundredth of an inch. Gives a magnified view of the human hair-follicle, containing the bulb of the hair, the appended sebaceous sac, and the duct containing the parasitic Arachnidan in question. That this parasite ranks with the Arachnida, and not with the red-blooded or any of the lower organised worms, is evident from the division of the body into thorax and abdomen, from the structure of the head and mouth, which are confluent with the thorax, and from the undivided abdomen. The thoracic appendages, eight in number, as in the Arachnida, are however of the simplest and most rudimental kind, and are terminated by three short setæ; the Anellidous type of the locomotive appendages being still retained. The inte-

* Water freezes. † Mercury freezes.

gument of the abdomen is very minutely annulated. The mouth is a suctorial one, or proboscidiform, consisting of two small spine-shaped maxillæ, and an extensile labium, capable of being elongated and retracted; it is provided on each side with a short and thick maxillary palp, consisting of two joints, and with a narrow triangular labrum above. Although the structure of the mouth, as described and figured by Dr Simon, has much analogy with that of the *Acari*, like which, also, the follicular parasite in one of its stages of developement is a hexapod, yet it differs from the *Acari*, and from all other *Holeteræ* of Duges, in the articulations of the thorax; whilst it equally differs from the *Pseudo-scorpionidæ*, and the *Pycnogonidæ*, which have the thorax articulated, in the rudimental form of the feet, and the structure of the trophi.

It can hardly be supposed that the changes of form indicated by the figures 8, 1, and 2 of Dr Simon's memoir can be acquired without ecdysis; but such a metamorphosis, with the natural divisions of the body and the structure of the oral and thoracic appendages, indubitably raise the parasite of the hair-follicle above the Entozoa, to which class Prof. Erichson, in Dr Simon's memoir, has correctly stated that the present parasite cannot belong. For the reasons above given, I cannot assent to the place which that accomplished naturalist has assigned to the Arachnidan in question among the *Acaridæ*, much less to the genus *Acarus*. Of the generic distinction of the parasite there can be no doubt, and I therefore propose to call it *Demodex folliculorum*, from δημος, lard, and δηξ, the name of a boring worm, indicative of the habitat and vermiform figure of this parasitic arachnidan, which insinuates itself into the hair-follicles and the sebaceous glands that communicate therewith.

On the active Principle of Malaria. By Dr GARDNER.—(*American Journal of the Medical Sciences*, April 1843.) In a long and interesting, partly experimental paper, Professor Gardner endeavours to prove that sulphuretted hydrogen gas is the really active agent in the production of malaria. He found from experiment that this gas is exhaled from all soils, marshes, or waters where malaria is known to exist; and, more than this, he even ascertained that, just in proportion to the deadliness of the malaria, was the amount of evolution of that gas. He also ascertained that the same soil or marsh affords very different quantities of this gas at different seasons; that in almost every instance it was much greater during the autumnal months, in some cases not detectable at any other season. Observation has proved that it is the autumnal season which is most productive of those diseases resulting from exposure to malaria, and Dr Gardner regards this as a strong corroboration of his theory. It is also pointed out that marshy districts to which the sea has occasional access are peculiarly unhealthy; and Dr Gardner attributes the increased production of malaria in such situations to the sea water supplying an increased quantity of sulphates for decomposition with vegetable matters—a view rendered more probable by the fact of several places which he mentions being now rendered healthy by the exclusion of the sea, though the marshes themselves yet remain. Another curious fact ascertained by Dr Gardner is, that negroes, who are able to resist malaria which would cut off whites, give off from their skins a much larger quantity of sulphuretted hydrogen than whites. This fact he ascertained by experiment; and he thinks it probable that this is the reason why they so escape, as they give off by cutaneous exhalation a quantity of gas fully equal to what is introduced to their bodies by air which is breathed. In this way also he accounts for the lessened susceptibility to malaria which those acquire who live long in marshy districts.

On the Contagious Nature of Puerperal Fever. By Dr O. W. HOLMES.

Chest.—Pleuritic adhesions on both sides, most extensive on the right; clusters of tubercles in different stages throughout the entire of right lung; clusters of tubercles, but not so numerous, also in the left lung; right, 47 ounces; left, 30½ ounces. Heart, 9¾ ounces.

Abdomen.—Old peritoneal adhesions; dark-coloured granular matter on the peritoneum Liver small, 38¾ ounces. Weight of the body, 93 pounds.

Case 646.—Aged 78 years. Phthisis combined with bronchitis. Subject to cough for some time; he had been several years in the workhouse, but his illness appeared to be of recent origin.

Head.—Brain small, slightly congested; weight, 37¾ ounces.

Chest.—Old pleuritic adhesions on both sides; tubercles general in both lungs; in masses in the upper lobe of right lung, and several small cavities, the largest the size of a hazel-nut; bronchial lining membrane, thickened; right, 32½ ounces; left, 24½ ounces. Heart, 7 ounces.

Abdomen.—Liver small, 35½ ounces; kidneys, 8¾ ounces. Weight of the body, 67½ pounds.

Case 647.—Aged 81 years. Phthisis combined with fluid in the brain. For some years an inmate of a chronic ward in the workhouse, where he died, delirious one day before death.

Head.—Convolutions of brain absorbed, and fluid in considerable quantity between them; the lateral ventricles were distended with fluid.

Chest.—Pleuritic adhesions on both sides, but most extensive on the left; clusters of miliary tubercles in the upper lobe of right, and the entire of left lung, the upper lobe of which was excavated with small tubercular cavities; much dark matter in the lungs; right, 20½ ounces; left, 30½ ounces. Heart, 9½ ounces.

Abdomen.—Liver small, 30 ounces; right kidney only 2½ ounces; left kidney, 6 ounces. Weight of the body, 86 pounds.

Case 648.—A stableman, aged 86 years. For some time in the workhouse; the disease appeared to have run its course rapidly; he died five weeks after his admission.

Head.—Brain natural.

Chest.—Slight pleuritic adhesions on both sides; some tubercles in the lower lobe of right lung, and a small tubercular cavity in its apex; several small tubercular cavities in the upper lobe of the left lung; structure of lung easily broken by slight pressure; right, 38½ ounces; left, 38 ounces. Heart, 9½ ounces.

Abdomen.—Liver, 37½ ounces; kidneys, 9 ounces. Intestines not examined. Weight of the body, 89 pounds.

Case 649.—Aged 87 years. Phthisis combined with pneumonia, and traces of former apoplexy. He died in a chronic ward in the workhouse.

Head.—Cysts with a yellow or rusty-coloured walls in the upper and outer side of the left *corpus striatum*.

Chest.—Pleuritic adhesions of the upper lobe of right lung; a large tuberculous cavity in its apex; some infiltration of the lower lobe with dark-coloured fluid; the lower lobe of the left lung in the second stage of pneumonia; right, 23 ounces; left, 28 ounces. Heart, 11½ ounces.

Abdomen.—Liver, 36 ounces; small cysts on the surface of each kidney, from which the capsules were easily stripped; weight, 8 ounces. Weight of the body, 112½ pounds.

Case 650.—Aged 91 years. Phthisis combined with emphysema and bronchitis. He died in a chronic ward in the workhouse, and seemed to sink from old age; he was able to sit up till within a day or two of his death.

Head.—Slight congestion on the surface of brain; 42½ ounces.

Chest.—Emphysema of lungs; slight pleuritic adhesions on left side only; at the posterior portion, and about the centre of left lung was some superficial tubercular ulceration; muco-purulent secretion in bronchial

tubes, and redness of the lining membrane; right, 25 ounces; left 24 ounces. Heart, 8 ounces.

Abdomen.—Liver small, 33 ounces; kidneys, 8 ounces; mucous membrane of the intestines dark-coloured; the lower portion of colon and rectum unusually contracted. Weight of the body, 82 pounds.

TABLE IV.—PULMONARY PHTHISIS.—(Females.)

Case 651.—Aged 4 months. Phthisis, combined with matter on the brain, and tuberculous spleen and kidney. In a moribund state on admission; died the day after.

Head.—Scrofulous matter in appearance, on the upper surface of both hemispheres, and between the convolutions of the brain.

Chest.—No pleuritic adhesions; tubercles very numerous in both lungs; several of them softened; two small tuberculous cavities in the upper lobe of each lung; weight of lungs, 5½ ounces.

Abdomen.—Numerous white and semicartilaginous specks on surface of the spleen, and a few also on surface of the kidneys; mesenteric glands enlarged. Height of the body, 21 inches; weight, 5¾ pounds.

Case 652.—Aged 4 months. Pulmonary tubercles, combined with lobular pneumonia, tubercular liver, pancreas, and peritoneum. Not a patient in the Infirmary.

Head.—Brain natural.

Chest.—Clusters of tubercles in the left lung; lobular pneumonia of the lower lobes of both lungs; right, 3 ounces; left, 2¼ ounces.

Abdomen.—Surface of liver and pancreas studded with tubercles beneath the peritoneum. Height of the body, 22 inches; weight, 4 pounds.

Case 653.—Aged 17 months. Pulmonary tubercles, combined with pneumonia, and scrofulous, bronchial, and mesenteric glands. Admitted to surgical ward with numerous sores on the body, and in a cachectic state. Death occurred two months after admission.

Head.—Brain natural.

Chest.—Some miliary tubercles and intervening pneumonia in the upper lobe of the left lung; its lower lobe studded with crude tubercles; chronic and lobular pneumonia of a portion of the lower lobe of the right lung; the anterior edge and apex of upper lobe firm like leather; scrofulous matter size of a nut in upper lobe of lung; right, 5 ounces; left, 6½ ounces. Bronchial glands enlarged and scrofulous.

Abdomen.—Mesenteric glands enlarged. Height of the body, 28 inches; weight, 16 pounds.

Case 654.—Aged 18 months. Phthisis combined with pleuritis, and enlarged mesenteric glands. She died two weeks after admission.

Head.—Brain natural.

Chest.—The upper half of the right lung firmly adherent by a thick layer of false membrane to the parietes; the adherent portion of lung thickly studded with tubercles; only a few tubercles in the lower non-adherent portion; a cavity size of a walnut in the apex; right lung, 4¼ ounces; left, 2¾ ounces; a firm scrofulous substance in the situation of the thymus.

Abdomen.—Mesenteric glands enlarged. Height of the body, 30 inches; weight, 9 pounds.

Case 655.—Aged 18 months. Pulmonary tubercles, combined with enlarged mesenteric glands. Not a patient in the Infirmary.

Head.—Brain natural.

Chest.—Tubercles very numerous in both lungs.

Abdomen.—Mesenteric glands enlarged. Height of the body, 32 inches; weight, 12 pounds.

Case 656.—Aged 4 years. Pulmonary tubercles, combined with pneumonia, scrofulous bronchial glands, tubercles on liver and spleen, and en-

larged mesenteric glands; a calculus in the kidney. She received medical attendance at home for six weeks.

Head large; brain 38 ounces.

Chest.—No pleuritic adhesions; some tubercles in the middle lobe of the right lung, and some scrofulous matter the size of an almond; the surrounding portion of lung in the first stage of pneumonia, as well as a portion of the lower lobes of both lungs; right, 6½ ounces; left, 5½ ounces. Bronchial glands scrofulous; some of them with central softenings; one of them contained a dark glairy fluid.

Abdomen.—Several small tubercles on surface of liver, and on the surface and in the substance of the spleen; there were tubercles also on the lining membrane of the pelvis of kidneys, in one of which was a mulberry calculus the size of a horse bean; mesenteric glands enlarged. Height of the body, 39 inches; weight, 23 pounds.

Case 657.—Aged 5½ years. Phthisis combined with pneumonia, fluid in the brain, scrofula in the spleen, and enlarged and fatty liver. Not a patient in the Infirmary. It was stated that she had been but three days confined to bed before her death with cough and dyspnœa; that six months before she had jaundice, and that she had never been in perfect health since.

Head.—More than usual quantity of fluid in lateral ventricles.

Chest.—No pleuritic adhesions; tubercles very numerous throughout both lungs; a small cavity in the lower portion of the upper lobe of the right lung; pneumonia of both lungs, but most extensive in the right; weight, 11 ounces; left, 8½ ounces.

Abdomen.—A white firm scrofulous substance in the centre of the spleen, which was enlarged, weight, 7 ounces; liver enlarged, pale, and fatty, weight, 31 ounces. Height of the body, 40 inches; weight, 22 pounds.

Case 658.—Aged 6 years. Phthisis, combined with hæmoptysis, pulmonary apoplexy, gangrene of the lung, and tubercular peritoneum. She was subject to slight attacks of convulsions before her admission; death occurred suddenly from a profuse discharge of blood from the chest eight weeks after her admission.

Head.—Brain had the natural appearance, weight, 34¾ ounces.

Chest.—Right lung appeared to be emphysematous; it contained several miliary tubercles; firm pleuritic adhesions on the left side; the upper lobe of left lung formed one cavity, entirely excavated, filled with clotted blood; the walls of the cavity rough, a gangrenous spot in one place the size of a shilling; the lower lobe of the lung, as well as that of the other lung, infiltrated with blood, and a portion of it in a state of pulmonary apoplexy; right, 5¾ ounces; left, 11½ ounces.

Abdomen.—Adhesions between the diaphragm, liver, and spleen; weight of the liver, 21¾ ounces; spleen, 3 ounces. Great omentum attached to left iliac fossa; several prominent tubercles in the omentum and peritoneum. Height of the body, 38 inches; weight, 26 pounds.

Case 659.—Aged 8 years. Phthisis, combined with tubercle and fluid in the brain, ulceration of the intestines, enlarged mesenteric gland, and diarrhœa, which came on two days before death; this occurred one month after admission.

Head.—Convolutions of brain flattened, the lateral ventricles distended, containing four ounces of fluid; a scrofulous tubercle in the posterior and upper portion of the left *corpus striatum*, but not involving the white central fibres.

Chest.—Pleuritic adhesions; tubercles in both lungs; a cavity in the apex of the right; two cavities in the left, both large, the largest one in its apex, the other at the base, having but a small portion of lung between it and the diaphragm; lungs together, 16¾ ounces.

Abdomen.—Ulceration of mucous membrane of the lower portion of the ileum and of the cæcum; mesenteric glands enlarged. Height of the body, 42 inches; weight, 22¾ pounds.

Case 660.—A servant, single, aged 18 years. Phthisis, combined with empyema and emphysema. She died six weeks and a half after admission.

Head.—Brain natural.

Chest.—Left lung compressed and adherent to the spine; the pleura half-filled with purulent matter; tuberculous cavities in the apices of both lungs; emphysema of the lower and middle lobes of the right lung; weight of lungs together, 32 ounces.

Abdomen.—Liver fatty, 35¼ ounces; spleen, 6 ounces. Weight of the body, 71 pounds.

Case 661.—A servant, single, aged 18 years. Apices of both lungs dull on admission; she walked about the ward till within three weeks of her death; cough very troublesome; no expectoration; the catamenia, which had been absent for some time previous, returned for a short period since her admission; under treatment in the Infirmary for nearly seven months.

Head.—Brain appeared natural, weight 46¼ ounces.

Chest.—Pleuritic adhesions, left lung like a honeycomb throughout from tuberculous excavations, except a small portion of margin of lower lobe; the upper lobe of right lung excavated in a similar manner to the left lung; some tubercles also in its lower lobe; weight of the lungs together, 49 ounces. Heart, 9¼ ounces.

Abdomen.—Liver fatty and large, 54½ ounces. The right kidney contained yellow gritty sandy particles. Weight of the body, 63½ pounds. Height, 4 feet 9 inches.

Case 662.—Aged 19 years. Phthisis combined with pleuro-pneumonia and tuberculous matter in right renal capsule. She had been ill for one month, and had an infant at the breast on admission. She died two months after.

Head.—Brain natural.

Chest.—Tubercles in different stages in the upper lobes, and small cavities in the apices of the lungs; pneumonia of their lower lobes, that of the right rough on surface from recent lymph; weight, 22 ounces; left, 33 ounces. Heart, 9½ ounces.

Abdomen.—Liver large, thin, and congested, it descended as low as the umbilicus; weight, 53 ounces. The right kidney wasted; left one proportionally enlarged. A tuberculous mass, size of an almond, in the right renal capsule. Intestines slightly congested. Weight of the body, 73¾ pounds.

Case 663.—Aged 21 years. Not a patient in the Infirmary.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions and false membrane on the costal pleura; the *pleura pulmonalis* studded with tubercles; softened tubercles in both lungs, which weighed together 40 ounces. Heart small, 7 ounces.

Abdomen.—Liver large, 64½ ounces. Kidneys, 10½ ounces. Spleen, 7 ounces. Weight of the body, 74½ pounds.

Case 664.—A servant, single, aged 21 years. Phthisis combined with *hydrops pericardii* and ulceration of the cæcum. Long affected with cough; no hæmoptysis. She died three months and a half after admission.

Head.—Brain firm, congested.

Chest.—Pleuritic adhesions; tubercles in lower lobes of both lungs; tuberculous cavities in their apices, the largest in the left, which weighed 23½ ounces; right, 25 ounces. Heart, 9½ ounces. The pericardium contained 3 ounces of straw-coloured fluid.

Abdomen.—There were three ulcers in the mucous membrane of the

cæcum, each about three-quarters of an inch long and half an inch broad. Weight of the body, 73¼ pounds.

Case 665.—A sempstress, aged 23 years. Phthisis combined with emphysema. She had cough for six months previous to admission; expectoration, transparent mucus, with many dark points; dyspnœa; crepitation in the lower part of the back on the right side. Death occurred seven weeks after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions of the upper lobes of both lungs; three small cavities in the apex of the left lung; isolated tubercles, size of hazel-nuts, not numerous, in the upper lobe of the right lung, some of them softened in its apex; emphysema of the lower lobe of right lung; weight, 17 ounces; left, 16 ounces.

Abdomen.—Organs appeared natural. Body greatly emaciated, weight, 64 pounds.

Case 666.—Aged 24 years. Phthisis combined with hydrothorax.

Head.—Brain natural.

Chest.—Pleuritic adhesions; some fluid in the right pleura; tubercles in both lungs, and cavities in their apices; weight together, 26¾ ounces. Heart small, 6¼ ounces.

Abdomen.—Liver large, 65¼ ounces. Spleen, 8¾ ounces. Enlargement of the mucous follicles in the stomach. Weight of the body, 73¾ pounds.

Case 667.—Aged 24 years. Phthisis combined with necrosis of the skull. She died seven weeks after admission. No cerebral symptoms; pain only from ulceration of scalp.

Head.—Skull perforated at one spot, around which the *dura mater* was adherent; the brain was also adherent to that portion of the *dura mater*; the brain and *dura mater* were adherent at a second point, opposite to which the outer table of the skull had exfoliated in two or three spots. There were several cicatrices on scalp.

Chest.—Pleuritic adhesions; tubercles throughout both lungs, except at their margins and the inferior portion of their lower lobes; right, 29¼ ounces; left, 30 ounces. Heart, 8¼ ounces.

Abdomen.—Organs large; liver, 60 ounces. Spleen, 10¼ ounces. Kidneys, 12 ounces. Weight of the body, 86 pounds.

Case 668.—A hawker, single, aged 26 years. Phthisis combined with ulceration of the intestines. She died six weeks after admission.

Head.—Brain large, 50¼ ounces.

Chest.—Pleuritic adhesions of long standing on both sides; a large quantity of crude tubercles in the lungs, and large cavities in the upper lobes of each, the left being most extensively excavated; weight, 25¾ ounces; right, 36¼ ounces. Heart, 7¾ ounces.

Abdomen.—Liver large, fatty, 57 ounces. Large and round patches of ulceration in the small intestines. Weight of the body, 76¾ pounds.

Case 669.—A servant, married, aged 27 years. Has had a cough for nine months; pain in the chest; sputa at first clear, greenish for last two months; hæmoptysis three weeks since; catamenia absent twelve months; emaciation six months. She died three weeks after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles and tuberculous cavities in both lungs; weight of lungs together, 45 ounces. Heart, 7¾ ounces.

Abdomen.—Liver, 50 ounces; kidneys, 6¾ ounces; intestines not examined.

Case 670.—A servant, single, aged 27 years. Phthisis combined with ulceration of the colon. Cough very troublesome for the last four weeks, and hæmoptysis two weeks ago; considerable emaciation. She had been a patient for some time in University College Hospital, where she had been several times cupped. Death occurred six weeks after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions; the right lung smaller than the left; tuberculous cavities in upper lobes, and tubercles in both lungs; most numerous in the left, which weighed 34 ounces; right, 24 ounces. Heart small, 7 ounces. An opening through the *foramen ovale*, sufficient to admit a goose quill.

Abdomen.—Liver, 45 ounces; kidneys pale; the capsules were easily stripped off; weight, 10¼ ounces. A few small round ulcers in the colon. Weight of the body, 73¼ pounds.

Case 671.—Aged 28 years. Phthisis combined with scrofulous mesenteric glands. She had received medical attendance at home for three months.

Head.—Brain natural.

Chest.—Strong pleuritic adhesions, especially on the left side; tuberculous cavities in the upper lobes, and tubercles throughout both lungs, except about one-third of the lower lobe of right lung, which was free from them; right, 23 ounces; left, 24 ounces. Heart small, 6 ounces.

Abdomen.—Liver, 53½ ounces; kidneys, 10¼ ounces. The mesenteric glands scrofulous. Weight of the body, 74 pounds.

Case 672.—Aged 28 years. Phthisis and absence of the left kidney. Cough for four months, and hæmoptysis for one month before, and at intervals of ten days since admission. She died fifteen weeks after.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; several small tuberculous cavities in the upper lobes of both lungs; tubercles throughout the entire of left lung, in the upper lobe of the right, and a few in its lower lobe; right, 20¼ ounces; left, 24¼ ounces. Heart small, 5¾ ounces.

Abdomen.—Liver small, 32¼ ounces; right kidney large, 7¼ ounces. The peritoneum smooth in the situation of the left kidney; no appearance of one existed, nor of the renal artery. The right and left renal capsules were unusually firm in structure, and both the same size; their weight together, half an ounce. Weight of the body, 59 pounds.

Case 673.—A servant, single, aged 30 years. Phthisis combined with ulceration of the bowels, diarrhœa, general anasarca, and ankylosis of the left knee. She had a troublesome cough for three weeks, and anasarca for one month previous to admission; stiffness of the knee-joint for several years. Death occurred nearly five months after admission.

Head.—More fluid than natural in the brain.

Chest.—Firm pleuritic adhesions on the left side; small tuberculous excavations throughout the left lung, giving it a honeycomb appearance; right lung comparatively healthy; weight, 22¼ ounces; left, 25 ounces. Heart small, 6 ounces.

Abdomen.—Small ulcers in the ileum, and follicular ulceration of the large intestines. Weight of the body, 87¾ pounds.

Case 674.—Aged 32 years. She died fifteen weeks after admission, and had given birth to a child a few months before.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides, but most extensive on the right; a large tuberculous cavity in the apex of the right lung, a smaller one in the apex of the left; tubercles in both lungs; farthest advanced and most numerous in the right, which weighed 37 ounces; left, 24 ounces. Heart, 7 ounces.

Abdomen.—Liver, 47½ ounces; kidneys, 10¼ ounces. Weight of the body, 57 pounds.

Case 675.—Married, aged 33 years. Phthisis combined with aphthæ of the mouth, ulceration of the larynx, enlargement of the thyroid gland, and fluid in the pericardium. Twelve months ill on admission; bloody sputa for two months; tongue swollen, and covered with aphthæ. She died three weeks after admission.

Head.—Brain exsanguineous.

Chest.—Pleuritic adhesions, tubercles, and numerous small cavities in both lungs, the right lung most extensively diseased; weight of lungs together, 38 ounces; ulceration around the *rima glottidis.* The thyroid gland enlarged; firmly united with it was a gelatinous mass. The pericardium contained 4 ounces of fluid.

Abdomen.—Liver small, 29 ounces; kidneys pale and large, 11¼ ounces; intestines not examined. Weight of the body, 76 pounds.

Case 676.—Married, aged 33 years. Phthisis combined with scrofula of the right kidney. She was transferred from the lying-in ward, confined of her fourth child; eight weeks under treatment.

Head.—Lateral ventricles unusually small.

Chest.—Numerous small tuberculous cavities in the upper lobes of both lungs, several of them filled with purulent matter; the inferior lobes of the lungs but slightly diseased; right, 30 ounces; left, 32¾ ounces. Heart large, 12¼ ounces.

Abdomen.—Liver much enlarged, 79¼ ounces; a large tubercular mass in the right kidney; weight of the kidneys, 13 ounces. Body weighed 93¼ pounds.

Case 677.—Aged 34 years. Phthisis combined with cancer of the uterus and a malignant ulcer of the leg. She was nearly six months in the Infirmary, and was admitted for a gangrenous ulcer, having a most offensive odour, situated at the upper portion of the tibia; there was caries of the bone; there was an offensive discharge from the vagina; a slight cough; diarrhœa for three weeks before her death.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions of the lower lobe of the left lung, which was quite excavated, forming one large cavity, with numerous bands crossing it; these had the appearance of obliterated vessels; the cavity contained some loose calcareous matter, and was lined by a fine smooth, shining membrane; it appeared to be of long standing. The patient had no expectoration, and but very little cough since her admission; nothing known of previous history; right lung healthy, weighed 9 ounces; left, 13 ounces. Heart, 8¼ ounces.

Abdomen.—A large waxy liver, of a reddish-brown colour; weight, 82¼ ounces; kidneys pale and large, 13 ounces; congestion of the mucous membrane of the small intestines; a portion of the uterus had an irregular soft ulcerated cancerous mass on its inner surface; weight, 3 ounces. Weight of the body, 72 pounds.

Case 678.—A sempstress, widow, aged 34 years. Phthisis combined with bronchitis and hæmoptysis. Has had a cough for two years, which has latterly become very troublesome, coming on suddenly at intervals, and continuing violent for a short time; hæmoptysis two months before admission; death occurred three months after.

Head.—Brain natural.

Chest.—Pleuritic adhesions and tuberculous cavities in the upper lobes of both lungs; miliary tubercles in their lower lobes; right, 21 ounces; left, 15 ounces. Heart, 7 ounces.

Abdomen.—Liver healthy, 40 ounces; kidneys, 6¼ ounces; intestines healthy. Weight of the body, 66 pounds.

Case 679.—Aged 35 years. Phthisis combined with emphysema and hydrothorax; cough and pain in the chest for two months before admission; seven weeks under treatment.

Head.—Brain exsanguineous.

Chest.—Pleuritic adhesions of the two lower thirds of the left lung; about three-fourths of a pint of fluid in the left pleura; a large cavity in the apex of the left lung; several smaller ones and numerous tubercles throughout the other portion of the lung; emphysema of the right lung;

a small cavity in its apex, and several miliary tubercles in the upper lobe; weight, 23 ounces; left, 14 ounces. Heart, 9½ ounces.

Abdomen.—Liver large, 58½ ounces; kidneys, 8 ounces. Weight of the body, 77¾ pounds.

Case 680.—Married, aged 35 years. Phthisis combined with tympanitis, ascites, and ulceration of the colon. Formerly a patient in the Infirmary; is affected with cough, &c., dependent on pulmonary tubercles; her general health having improved, she went to the country three months since. On her last admission she was affected with tympanitis and ascites, and died in five weeks after; diarrhœa came on four weeks before her death.

Head.—Brain natural.

Chest.—Nearly the entire of the left lung occupied with tubercles and tuberculous cavities; a small tuberculous cavity in the apex of the right lung; weight, 19 ounces; left, 26½ ounces. Heart small, 6½ ounces.

Abdomen.—Filled with fluid; liver small, tuberculated on the surface; weight, 34½ ounces; ulceration of the colon. Weight of the body, 76 pounds.

Case 681.—A charwoman, married, aged 35 years. Phthisis combined with ulceration of the large intestines, and diarrhœa; affected with cough and an obstinate diarrhœa for ten months previous to admission; she died in three days after.

Head.—Brain natural.

Chest.—Pleuritic adhesions, and a thick layer of false membrane, particularly on the left side; tubercles in both lungs, and a large cavity in the apex of the left; weight of lungs together, 47 ounces. Heart, 7 ounces.

Abdomen.—Liver large, 60 ounces; kidneys, 9½ ounces; very extensive ulceration of the mucous membrane of the large intestines; a fibrous tumour, the size of a pigeon's egg, in the body of the uterus; and a serous cyst about the same size attached to the left ovary; weight of the uterus, 4½ ounces. Weight of the body, 71 pounds.

Case 682.—Aged 36 years. Phthisis combined with anasarca. She kept her bed for a long period, and died in a chronic ward in the workhouse.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions of both lungs; a large cavity occupied almost the entire of the upper lobe of left lung; the lower lobe nearly filled with tubercles in different stages; a cavity size of a walnut in the apex of the right lung, and some tubercles in its lower lobe; right, 31½ ounces; left, 18 ounces. Heart small, 6½ ounces.

Abdomen.—Liver enlarged, 57½ ounces; anasarca of the lower extremities. Weight of the body, 64 pounds.

Case 683.—A laundress, widow, aged 38 years. Phthisis combined with tubercles in the liver, kidneys, mesenteric glands, and ovaries; and softening and congestion of the mucous membrane of the intestines. She died three weeks after admission.

Head.—Brain not examined.

Chest.—Pleuritic adhesions on the right side; a tuberculous cavity, size of a cricket ball, in the centre of the right lung, external to which the pericardium was firmly adherent; congestion of its lower lobe. The left lung was studded with tubercles; right lung, 31½ ounces; left lung, 25½ ounces. Heart, 9½ ounces.

Abdomen.—Congestion of the intestinal mucous membrane, dark patches, size of a crown piece, with softening in several places; liver studded with small yellow points size of mustard seed; the cortical and tubercular portions of the kidney studded in a similar manner to the liver; the mesenteric glands also presented a similar appearance; in the left ovary were several scrofulous tubercles, some as large as a pea; a serous cyst in the right ovary, the size of a hazelnut; the lining membranes of vagina and uterus

congested; weight of the uterus, 3 ounces. The body weighed 73 pounds.

Case 684.—Aged 38 years. Phthisis combined with tubercular peritoneum. Affected for some time with cough and occasional diarrhœa; formerly had an attack of peritonitis and ascites. She died eighteen weeks after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercle in both lungs; a large cavity in the apex of the left, and a small in that of the right lung; weight, 20¼ ounces; left, 18¼ ounces. Heart, 7¼ ounces.

Abdomen.—Omentum contracted, with tuberculous accretions; kidneys pale and small. Weight of the body, 83¼ pounds.

Case 685.—Aged 39 years. Four weeks under treatment.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions on the whole of the left side, and upper half of the right; a large cavity, occupying nearly the entire of the upper lobe of the left lung; tubercles in different stages in its lower lobe; the upper lobe of the right lung occupied by tubercles, and a small cavity in its apex; right, 36¼ ounces; left, 31 ounces. Heart, 11 ounces.

Abdomen.—Liver pale and large, 56 ounces; kidneys, 12¼ ounces; spleen, 7 ounces. Weight of the body, 101 pounds.

Case 686.—Aged 39 years. Phthisis and diseased kidneys; affected with cough for two years, and hæmoptysis occasionally; the last time, two weeks before admission; she died three days after.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles in both lungs; some softened ones in the apex of the left, and slight engorgement of lower lobe; a cavity in the apex of the right lung; right, 19 ounces; left, 21¼ ounces. Heart, 9¼ ounces.

Abdomen.—The left kidney almost entirely occupied by cysts filled with urinous fluid; its pelvis distended and natural; structure destroyed; weight of the kidneys, 6¼ ounces. Weight of the body, 74¼ pounds.

Case 687.—A charwoman, single, aged 40 years. Has had a cough for twelve months, and occasional hæmoptysis for eight months; she died five weeks after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles in both lungs; a large cavity in the upper lobe of the left lung; a small cavity in the apex of the right lung; right, 42¼ ounces; left, 23¼ ounces. Heart, 10 ounces.

Abdomen.—Liver broad and large, 63¼ ounces; intestines healthy. Weight of the body, 83¾ pounds.

Case 688.—Aged 40 years. Phthisis combined with epilepsy; she had been subject to epileptic fits since infancy, for which she had frequently been under medical treatment; the fits had latterly been more frequent; the symptoms of phthisis had only recently appeared; death occurred one week after admission.

Head.—The brain was unusually firm and pale; there appeared to be hypertrophy of that organ, as if too large for the skull; weight of the brain, 41 ounces.

Chest.—Pleuritic adhesions of the upper lobes of both lungs; a tuberculous cavity, the size of an orange, in the apex of the left lung; smaller cavities, and tubercles, in other portions of its upper lobe; clusters of tubercles, some of them softened, and small cavities in the upper lobe of the right lung; right, 24 ounces; left, 24¼ ounces. Heart, 12 ounces.

Abdomen.—Liver, 49 ounces; kidneys small, 6¼ ounces; spleen small, 2¼ ounces. Weight of the body, 83½ pounds.

Case 689.—Aged 40 years. Phthisis combined with emphysema; death occurred nine weeks after admission.

Head.—Brain natural.

Chest.—A considerable quantity of pus in the right pleura; the right lung compressed, nearly filled with tubercles; several small cavities in its upper lobe; a few tubercles in the upper lobe of the left lung; lungs together, 45 ounces. Heart small, 5½ ounces.

Abdomen.—Cirrhosis of liver; small elevations on its surface; weight, 42 ounces; kidneys, 8¾ ounces; spleen, 11½ ounces. Weight of the body, 73½ pounds.

Case 690.—A charwoman, widow, aged 41 years. Phthisis combined with ulceration of the colon, and anasarca of the legs. Has had a cough for twelve months; œdema of legs, one week previous to admission; she died one week after.

Head.—Brain natural.

Chest.—Pleuritic adhesions of both lungs; tubercles in the upper lobes of both lungs; a large tuberculous cavity in the apex of the right lung; congestion of the lower lobe of the left lung; right, 31 ounces; left, 37 ounces. Heart, 9 ounces.

Abdomen.—A few small ulcers on the mucous surface of the colon. Uterus, a small polypus attached to the *os tincæ*, size of a horse-bean. Weight of the body, 88 pounds.

Case 691.—A sempstress, aged 41 years. Phthisis combined with emphysema, peritonitis, and ulceration of the cæcum. Affected with cough for three months previous to admission, also pain in the abdomen, and blood in the motions; she had been a patient in Middlesex Hospital, which she left the day before; death occurred one month after her admission.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions of the upper lobes of both lungs; tubercles in both upper lobes and cavities in their apices; emphysema of their lower lobes, and anterior edges of upper; right, 17 ounces; left, 23½ ounces. Heart, 7½ ounces.

Abdomen.—Pus with flakes of lymph in the peritoneum; the omentum adherent to fundus of uterus, with a layer of recent lymph intervening; small white granulations on peritoneal covering of the liver and mesentery. Weight of the body, 67 pounds.

Case 692.—Married, aged 42 years. Phthisis combined with enlarged heart, anasarca of the lower extremities, and a clot in each iliac vein. She died three days after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions; tubercles throughout both lungs; a cavity in the apex of each; right, 23½ ounces; left, 31 ounces. Heart enlarged, and cavities distended with fibrine; weight, 11¾ ounces.

Abdomen.—Liver large, 61¾ ounces; kidneys, 9½ ounces. Anasarca of the thighs and legs; a firm clot of fibrine in each iliac vein. Weight of the body, 97½ pounds.

Case 693.—Aged 43 years. Phthisis combined with enlarged heart. She died in a chronic ward in the workhouse.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles in the upper lobes of both lungs, most numerous in the left, a small cavity also in its apex; right, 12½ ounces; left, 15½ ounces. Heart enlarged; its cavities distended with clots; weight, 11 ounces.

Abdomen.—Liver enlarged, 54½ ounces. Intestines not examined. Weight of the body, 76 pounds.

Case 694.—A sempstress, married, aged 43 years. Pulmonary tubercles combined with bronchitis and diarrhœa. Had only been affected with cough for two months; tough brownish sputa; bowels relaxed for some time; tongue coated white; pulse small and feeble, 100; bowels not relaxed since her admission; she sunk gradually, and died in three days after.

Head.—Brain natural.

Chest.—No pleuritic adhesions. Tubercles very numerous in both lungs, varying in size from that of a mustard seed to a small pea. Redness of the bronchial lining membrane; right lung, 31½ ounces; left, 39½ ounces. Heart, 7½ ounces.

Abdomen.—Liver large and fatty, unusually flattened; weight, 56 ounces. Intestines healthy. Weight of the body, 79½ pounds.

Case 695.—Aged 45 years. Phthisis combined with pneumonia, hydrothorax, and enlarged heart. Not a patient in the Infirmary. She had been attending as an out-patient, and died suddenly, the urgent symptoms having only come on four hours previous to her death.

Head.—Brain natural.

Chest.—Contained one pint of fluid; tubercles in the lungs, and a cavity in the apex of the right, and pneumonia of a portion of the same lung; right, 25½ ounces; left, 16½ ounces. Heart fatty, enlarged, and flabby; weight, 12½ ounces.

Abdomen.—Liver enlarged, 62 ounces; kidneys, 11½ ounces. Weight of the body, 108 pounds.

Case 696.—Aged 45 years. Phthisis combined with bronchitis, enlarged heart, and dropsy. She died four weeks after admission.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions on both sides; tubercles in clusters here and there throughout both lungs, most numerous in their upper lobes, in which were also several small cavities; right, 25 ounces; left, 23¾ ounces; redness of the bronchial lining membrane; heart enlarged, no valvular disease, 12 ounces.

Abdomen.—Contained a considerable quantity of straw-coloured fluid; liver small and hard, 38 ounces; kidneys pale and flabby, 10 ounces; anasarca of legs and thighs. Weight of the body, 96 pounds.

Case 697.—A sempstress, aged 45 years. Phthisis, combined with bronchitis and diarrhœa. She died seven weeks after admission.

Head.—Brain natural.

Chest.—Tubercles in both lungs, and cavities in their apices; general redness of bronchial lining membrane. Weight of lungs together, 50¾ ounces. Heart small, 6¼ ounces.

Abdomen.—Liver nutmeg, much enlarged, 70 ounces; kidneys, 7 ounces. Weight of the body, 61 pounds.

Case 698.—Aged 45 years. Phthisis combined with chronic laryngitis, hæmoptysis, diseased liver, ulceration of intestines, and dropsy. Subject to cough and dyspnœa for a long time; blueness of the face, aphonia, diarrhœa three days before admission; she died in two months after, suddenly, from an attack of hæmoptysis.

Head.—Brain not so firm as usual.

Chest.—Some fluid in the right pleura; right lung somewhat compressed, smaller than the left; tubercles in both lungs, and small cavities in their upper lobes; right, 19½ ounces; left, 21 ounces; ulcers in larynx, and upper portion of trachea. Heart small, 7 ounces; *foramen ovale* sufficiently open to allow a common pencil for drawing to pass through.

Abdomen.—Contained three pints of fluid; intestines pale; a considerable number of oval ulcers in the great intestines; kidneys large, 12½ ounces; liver very much enlarged, the structure, in colour and consistence, resembled bees' wax; weight, 130 cunces. Weight of the body, 97½ pounds.

Case 699.—Aged 45 years. Two months before, she had left the Infirmary, and was readmitted, having become worse the last week. There was dulness of the apex of right lung when admitted; no expectoration. Three weeks before death there was fever, pain in the throat, and hoarseness; these symptoms subsequently decreased; she died six weeks after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles in both lungs, most numerous in the right; several small cavities in its apex; a small cavity in the apex of left lung also; right, 26 ounces; left, 24¼ ounces. Heart, 10 ounces.

Abdomen.—Liver large, 65 ounces; kidneys, 13 ounces; spleen, 11 ounces. Weight of the body, 76 pounds.

Case 700.—Aged 46 years. Not a patient in the Infirmary. Phthisis, combined with engorgement of right lung.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions on both, but most extensive on the left side; tubercles in both lungs; several tuberculous cavities in the upper lobe of the left lung, and a quantity of dark-coloured matter, and cavity size of a pigeon's egg, in the apex of the right lung; its lower lobe engorged; right, 41 ounces; left, 20½ ounces. Heart, 9 ounces.

Abdomen.—Liver nutmeg, 56½ ounces; intestines healthy. Weight of the body, 94½ pounds.

Case 701.—Aged 46 years. Phthisis, combined with hæmoptysis. Has been affected with cough more or less for two years; night sweats; copious puriform expectoration; sound dull posteriorly in interscapular region; resonance of voice, pectoriloquy. She died six weeks after admission.

Head.—Brain natural.

Chest.—Tubercles in the upper lobe of the right lung, and a small cavity in its apex; a few tubercles in the apex of the left lung; right, 30 ounces; left, 18½ ounces. Heart, 11 ounces.

Abdomen.—Organs appeared healthy. Weight of the body, 97¾ pounds.

Case 702.—Married, aged 49 years. Phthisis combined with acute pleurisy. Has had a cough for six months, and diarrhœa for two weeks. She died three days after admission.

Head.—Brain small, 38 ounces.

Chest.—Some recent lymph on the pleura of left side; tubercles in both lungs, and a large cavity in the apex of the left lung; lungs together weighed 56 ounces. Heart small, 6½ ounces.

Abdomen.—Liver small, fatty, 36 ounces; kidneys small, 5¾ ounces; spleen, 2 ounces; stomach, 4¾ ounces; pancreas, 1¾ ounce; uterus, 1¾ ounce. Weight of the body, 59 pounds.

Case 703.—Aged 49 years. Phthisis with pneumonia.

Head.—Brain natural.

Chest.—Pleuritic adhesions on one side; the lung nearly solid from tubercles and intervening pneumonia; two small cavities in its apex; the other lung large. Heart, 11¼ ounces.

Abdomen.—Liver, 47¼ ounces; kidneys, 11¾ ounces. A clot of blood in one ovary. Weight of the body, 86 pounds.

Case 704.—Aged 49 years. Phthisis, combined with ulceration of the intestines. Has had a cough for three months, and dyspnœa for two months previous to admission.

Head.—Brain small, 36¾ ounces.

Chest.—Firm pleuritic adhesions on both sides; tubercles in both lungs; a large cavity in the apex of the left; a small cavity, size of a hazelnut, lined by a thick false membrane, in the right apex, and a second one, the same size, filled with tough tuberculous matter; right, 34 ounces; left, 27 ounces. Heart large, 11 ounces.

Abdomen.—Some small, oval, and round ulcers cicatrized in both the great and small intestines; mucous membrane deficient; organs natural. Weight of the body, 84½ pounds.

Case 705.—Aged 49 years. She has had a cough and occasional hæmoptysis for the last three months; pain at epigastrium; catamenia absent three years. Death occurred three months after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions on both sides; tubercles in both lungs; a large cavity in the apex of the left lung; right, 23 ounces; left, 19 ounces. Heart small, 6½ ounces.

Abdomen.—Liver fatty, 46 ounces; kidneys, 9 ounces; spleen, 2½ ounces; intestines healthy. Weight of the body, 63¾ pounds.

Case 706.—A basketwoman, widow, aged 50 years. Phthisis combined with pneumonia and fluid in the brain. Affected with cough for three months, and hæmoptysis within the last fortnight. She died four days after admission.

Head.—Brain pale, less firm than usual, fluid beneath the arachnoid; weight, 34½ ounces.

Chest.—Strong pleuritic adhesions on both, but particularly on the right side; tubercles on both lungs; and a cavity in the back part of the upper lobe of the right lung; right, 22½ ounces; left, 17½ ounces. Heart, very small, 4¾ ounces.

Abdomen.—Liver dark-coloured and unusually firm, 41 ounces; kidneys, 9¼ ounces; spleen, 8 ounces. Weight of the body, 66½ pounds.

Case 707.—Aged 53 years. She died eleven days after admission.

Head.—Brain natural.

Chest.—Firm pleuritic adhesions on both sides; tubercles in both lungs, but most numerous and farthest advanced in the right, in the upper lobe of which were several small cavities; right, 38¾ ounces; left, 22¾ ounces. Heart small, 7 ounces.

Abdomen.—Organs appeared natural. Weight of the body, 81 pounds.

Case 708.—Aged 55 years. Pulmonary tubercles, combined with pneumonia, hydrothorax, and aneurism of the arch of the aorta. Has been affected with cough for twelve months, and bloody expectoration for the last six weeks; catamenia absent for nearly four years. She died four weeks after admission. This patient had been in the Infirmary on a former occasion for ten or twelve weeks, and Dr Macreight then detected an aneurism of the aorta; six months intervened from her being discharged at that time and her re-admission. She then complained of a dull pain in the left hypochondrium, attributed to a fall more than two years before; the pain afterwards becoming more acute on attempting to raise the arm. A pulsation between the second and third ribs to the right of the sternum; pulse 88, weak, smaller in the left than right wrist, bruit accompanying the pulse; alternating with the bruit was a clear sound.

There was an obstruction to swallowing felt at the upper portion of the sternum. The second sound from the aorta was stronger than the first; louder high up in the back than below; pulsation of left carotid stronger than the right. These symptoms have been more fully described; see case 5, Aneurism of the Thoracic Aorta, Lancet, No. 18, Vol. i. 1840–41.

Head.—A tumour, size of a filbert, attached to the *dura mater*, above, about the centre, between the hemispheres.

Chest.—Firm pleuritic adhesions on both sides; false membrane on pleura, covering the right lung; some cheesy and earthy matter in its upper lobe. A pint and half of fluid in the left pleura, tubercles in the lung, and a portion of it in the third stage of pneumonia; right lung weighed 24¼ ounces; left, 25 ounces. Heart, 9¼ ounces. An aneurismal sac, which would contain a cricket ball, depending from the concavity of the arch of the aorta, filled with fibrine, the walls of variable thickness. The upper part of the arch in a healthy condition, four vessels arose from it, the *arteria innominata*, left carotid, left vertebral, and left subclavian, which was smaller than the right. There was a free channel for the blood, anterior to the sac, in the natural course of the aorta; about two-thirds the aneurismal sac were below this channel, one-third superior and posterior to it. The œsophagus was pressed upon and attached to the sac posterior-

ly; the inferior part of the trachea, the upper part of the right bronchus, and lower part of left, were partly imbedded in it. The *venæ innominatæ* were attached to the sac, the left was pressed upon and its calibre diminished, being imbedded in its substance.

Abdomen.—Kidneys, 10½ ounces; spleen, 2 ounces. Other organs natural. Weight of the body, 82 pounds.

Case 709.—Aged 56 years. Phthisis combined with pneumonia, enlarged heart, and hemiplegia. She died three days after admission.

Head.—Brain not examined.

Chest.—Small tuberculous cavities, and tubercles; a portion of the right lung in the third stage of pneumonia; right, 23½ ounces; left, 11½ ounces. Heart enlarged, 14½ ounces.

Abdomen.—Kidneys, 10¼ ounces. Weight of the body, 89 pounds.

Case 710.—Aged 62 years. She died in a chronic ward in the workhouse.

Head.—Brain pale.

Chest.—Firm pleuritic adhesions on the right side only; tubercles in the right lung and tuberculous cavities in its upper lobe; congestion of the upper lobe of the left lung; it was quite free from tubercles; right, 29 ounces; left, 18¼ ounces.

Abdomen.—Liver fatty, 39 ounces. Small intestines congested. Weight of the body, 73 pounds.

Case 711.—Aged 62 years. Pulmonary tubercles combined with bronchitis. She died one month after admission.

Head.—Brain natural.

Chest.—No pleuritic adhesions; clusters of tubercles in both lungs, some of them in a softened state; several miliary, dark-coloured, and others semitransparent; redness of bronchial lining membrane; weight of lungs, 13½ ounces. Heart small, 5¼ ounces.

Abdomen.—Liver, 33¼ ounces; kidneys, 4¼ ounces; pancreas, 2 ounces; spleen, 1½ ounce. Cicatrix of an ulcer in the stomach. Weight of the body, 50 pounds.

Case 712.—A needlewoman, widow, aged 63 years. Phthisis combined with pneumonia. Cough had existed for six months, and latterly dyspnœa. She died forty days after admission.

Head.—Brain natural.

Chest.—Slight pleuritic adhesions; tubercles in both lungs, some of them softened, and two small cavities in their upper lobes; a slight degree of pneumonia of the lower lobes, principally at the root of the right, which weighed 23 ounces; left, 21½ ounces. Heart, 9 ounces.

Abdomen.—The mucous membrane of the large intestines appeared thickened; a fibrous tumour, the size of a walnut, attached to the fundus of the uterus. Weight of the body, 66¼ pounds.

Case 713.—Aged 63 years. Phthisis combined with general dropsy. She died three weeks after admission.

Head.—The lateral ventricles distended with fluid.

Chest—Contained fluid on both sides; tubercles in the upper lobes of both lungs; and a large cavity in the apex of the left lung; right, 20¼ ounces; left, 17¼ ounces. Heart small, 6¼ ounces.

Abdomen—Contained fluid; the peritoneum opaque, it appeared to be thickened; liver small, 33¼ ounces; kidneys small, 6 ounces; anasarca of the lower extremities. Weight of the body, 83¼ pounds.

Case 714.—Aged 64 years. Phthisis combined with ulceration of colon; a gangrenous ulcer on right leg. In an exceedingly low state when admitted, and suffering from diarrhœa. Death occurred two days after admission.

Head.—Brain natural.

Chest.—Pleuritic adhesions of the upper lobes of both lungs; tubercles

in both, in different stages; a large cavity in the apex of the left lung; congestion of its lower lobe; two or three small cavities in apex of right lung, one filled with purulent matter; right, 15 ounces; left, 26½ ounces. Heart small, 6 ounces.

Abdomen.—Liver large, fatty; venous hepatic congestion; weight, 52 ounces. Kidneys, 6½ ounces. Several osseous bodies, from the size of a pea to that of a hazelnut, attached to the mesentery and serous surface of intestines; a loose one of largest size, semicartilaginous on surface, and bony in the centre, in the abdomen; a hard particle in mucous membrane of stomach; ulceration of the mucous membrane of the cæcum and upper portion of colon. Weight of the body, 67¾ pounds.

Case 715.—A sempstress, widow, aged 64 years. Phthisis combined with lupus, which had destroyed the alæ of the nose. When admitted the integument of the face was nearly cicatrized, but there still remained an unpleasant discharge from the right nostril, and caries of the palate bones on that side. Her general health got much worse for six weeks before admission; she was affected with cough and pain in the left side, and œdema of the hands and feet; she was five months and a half under treatment in the Infirmary. For several years she was in the habit of taking opium.

Head.—Congestion of the brain.

Chest.—Firm pleuritic adhesions on the left side only; some fluid in the right pleura; the left lung almost solid with tubercles, several small cavities in its apex; right, 26 ounces; left, 34½ ounces. Heart, 9 ounces.

Abdomen.—Liver large and soft, 68½ ounces; kidneys, 9½ ounces; cæcum distended with flatus, its coats thin; the mucous membrane of intestines healthy. Weight of the body, 91 pounds.

Case 716.—Aged 65 years. Pulmonary tubercles, combined with bronchitis. She died two days after admission.

Head.—Congestion of the brain, weight, 46 ounces.

Chest.—Pleuritic adhesions on both sides; lungs appeared to be indurated, particularly the left, which was unusually small; tubercles in both lungs; redness, and apparent thickening of the bronchial lining membrane; right, 21½ ounces; left, 13¾ ounces. Heart, 8¾ ounces.

Abdomen.—Liver, 39½ ounces; kidneys, 10½ ounces; spleen, 2½ ounces. Weight of the body, 83 pounds.

Case 717.—Aged 68 years. Phthisis, combined with ulceration of the intestines and diarrhœa. She died three weeks after admission; diarrhœa for two weeks previous.

Head.—The lateral ventricles contained about two drachms of fluid; the septum softer than usual.

Chest.—Old pleuritic adhesions on both sides; tubercles in both upper lobes; a large cavity in the apex of the right lung, and several small ones in the back part of the upper lobe of the left lung; right, 24 ounces; left, 15½ ounces. Heart, 9 ounces.

Abdomen.—Liver, 46 ounces; extensive ulceration of the mucous membrane of great intestines, especially of the cæcum and adjoining portion of the colon. Weight of the body, 68½ pounds.

Case 718.—Aged 70 years. Phthisis combined with pneumonia. Not a patient in the Infirmary.

Head.—Brain natural.

Chest.—Slight pleuritic adhesions of the upper lobe of the left lung only; tubercles and small tuberculous cavities, and pneumonia intervening, in the upper lobes of both lungs; right, 26 ounces; left, 22½ ounces. Heart, 7 ounces.

Abdomen.—Spleen large, 15½ ounces. Weight of the body, 64 pounds.

Case 719.—Aged 70 years. Phthisis combined with pneumonia. For several weeks in a sinking state, in a chronic ward of the workhouse.

Head.—Brain small; 39 ounces in weight.

Chest.—Firm pleuritic adhesions; tubercles and tuberculous cavities in both lungs; the posterior portion of the inferior lobe of the right lung in the second stage of pneumonia; right, 30 ounces; left, 20 ounces. Heart, 7 ounces.

Abdomen.—Liver small, 35 ounces; kidneys, 6½ ounces; pancreas, 7½ ounces; the large intestines tympanitic; a triangular-shaped cartilaginous substance, size of a peach-stone, attached to the gastro-epiploïc omentum by a thin neck. Weight of the body, 69¾ pounds.

Case 720.—Aged 72 years. Phthisis combined with effusion of the brain, and ulceration of ileum; in a debilitated condition; affected with slight cough; and bed-ridden for several months in a chronic ward in the workhouse.

Head.—A thin layer of fibrine on the arachnoid lining the *dura mater*, and it was dotted with bloody specks; the lateral ventricles contained one ounce of muddy serum; weight of the brain, 36¾ ounces.

Chest.—Pleuritic adhesions on both sides; tubercles in both lungs; small tuberculous cavities in the upper lobe of right lung; 23½ ounces; left, not weighed.

Abdomen.—Nutmeg, soft, and fatty liver; venous hepatic congestion; weight, 33½ ounces; kidneys, 6½ ounces; ulcers on the mucous membrane of ileum, of a circular form, and dotted with white specks. Weight of the body, 74½ pounds.

Case 721.—A washerwoman, widow, aged 76 years. Phthisis combined with emphysema, bronchitis, pneumonia, scirrhus of some of the abdominal glands, and anasarca of the lower extremities for one month; cough only troublesome for four months; she died one week after admission.

Head.—Brain appeared natural, 38½ ounces.

Chest.—Pleuritic adhesions of upper lobes of both lungs posteriorly; emphysema of their edges anteriorly; tubercles in their upper lobes and cavities in their apices, each cavity the size of a walnut; a few clusters of miliary tubercles in their lower lobes; pneumonia of the posterior portion of the lower lobe of the right lung; muco-purulent secretion in the bronchial tubes, and redness of the lining membrane; right, 26 ounces; left, 19½ ounces. Heart small, 6½ ounces.

Abdomen.—Several tubercles, size of a pin's head, both in the substance and on the surface of the liver; its weight, 38½ ounces; around the small end of the pancreas were several enlarged carcinomatous glands, one of them dark-coloured in the centre; a mass of cancerous structure on either side of the abdominal aorta, varying from half an inch to one and a half inch in breadth; the iliac arteries were nearly surrounded with a similar structure; osseous plates and atheromatous degeneration in those arteries; intestines healthy; kidneys pale and small, 5 ounces. Weight of the body, 83¾ pounds.

Case 722.—Aged 79 years. Phthisis combined with bronchitis and ulceration of the colon. She died in a chronic ward in the workhouse.

Head.—Brain natural; weight, 39½ ounces.

Chest.—Pleuritic adhesions of the apex of the right lung only, two or three small tuberculous cavities in its apex, and some dark-coloured tubercles; there appeared to be thickening and redness of the bronchial lining membrane; right, 14 ounces; left, 13½ ounces. Heart small, 5½ ounces.

Case 723.—Aged 86 years. Phthisis combined with pleuro-pneumonia and diarrhœa; for some years in a chronic ward in the workhouse; has had only a slight cough; she only complained of the diarrhœa, which came on and continued for one week before death.

Head.—There were two drachms of fluid in the lateral ventricles of the brain; its weight, 39½ ounces.

Chest.—Firm pleuritic adhesions on both sides; numerous tubercles and small cavities in the upper lobe of the left lung; cysts formed by adhe-

sions of false membrane, containing fluid, between the base of the right lung and the diaphragm; pneumonia in second stage in the lower lobe, and a portion of the upper of the right lung; right, 30 ounces; left, 20½ ounces. Heart, 6½ ounces.

Abdomen.—Liver small, 24½ ounces; kidneys small, 5 ounces; spleen, 2 ounces; intestines healthy; osseous plates and atheromatous degeneration in the arteries. Weight of the body 66 pounds.

Case 724.—Aged 90 years. Phthisis combined with fluid in the brain and gangrenous sore on sacrum; the latter from long confinement to bed; subject to convulsions for a long period; an inmate of a chronic ward in the workhouse.

Head.—The lateral ventricles were distended, and they contained two ounces of clear fluid; weight of the brain, 45½ ounces.

Chest.—Firm pleuritic adhesions on both sides; tubercles in both lungs; a cavity, the size of an orange, in the apex of the left lung; four smaller cavities, each the size of a filbert, in the apex of the right lung; right, 22 ounces; left, 20 ounces. Heart large, 10 ounces.

Abdomen.—Liver, 44 ounces; kidneys small, 6½ ounces; in the left kidney, at the upper part, was a yellow scrofulous substance, the size of an almond.

ANALYSIS.

During three years, 1840–42 inclusive, 206 cases of pulmonary phthisis, 132 males and 74 females, have been examined.

These cases, in the following analysis, have been divided into three classes; the 1st, children, the oldest 11 years; 2d, adults, from 17 to 60 years; 3d, persons of 60 years and upwards. In the 1st class are included 18 male and 9 female children; in the 2d class, 93 male and 50 female adults; and in the 3d class, 21 males and 15 females of 60 years and upwards. Among the 206 cases of phthisis examined, it is remarkable that there was not one between the ages of 11 and 17.

Seat of the Disease.

Tubercular cavities occurred in the first class among 8 males and 5 females; in 4 males and 2 females, the cavities were situated in the apices of the lungs; in 1 male in the apex of the left, and middle lobe of the right lung, No. 531; in 1 male in the apex of right and lower lobe of left, No. 524; in 2 males and 1 female in the apex of the left lung only; in 2 females in the apex of the right lung only; and in the lower lobe of the right lung in one male, No. 520. With one exception, No. 530, where cavities occurred in only one lung, there were tubercles in the other lung. Among the second class, tuberculous cavities were found in the upper lobes of both lungs in 50 males and 33 females; in 1 male in the upper lobe of the left and middle lobe of the right lung. Of these cases, the left lung was most diseased in 7 males and 9 females, and the right lung in 10 males and 3 females; the cavities were lined by a membrane in 3 cases of the right, and 2 of the left lung. Cavities were only found in the upper lobe of the left lung in 21 males and in 7 females; the entire of the lower lobe of the left lung was occupied by a cavity in 1 female, No. 677. The cavities were confined to the right lung in 17

males and 8 females. Where cavities existed only in one lung, tubercles were found in the opposite, with but few exceptions.

In the third class there were tuberculous cavities in the upper lobes of both lungs in 8 males and 7 females; of these, the left lung was most diseased in 4 males and 1 female, and the right in 1 male and 1 female. The left lung only contained cavities in 6 males and 3 females; and the right lung only in 2 males and 4 females. In all cases where cavities existed in one lung, there were tubercles in the other lung except in 2 females.

Tubercles without cavities in the first class, were found in both lungs in 9 males and 2 females; in the left lung, only in 1 male and 1 female; in the right lung, only in 1 female.

In the second class, there were tubercles without cavities in both lungs, in 4 males and 4 females.

In the third class, in 1 male and 2 females tubercles but no cavities were found. The disease was nearly equal in the two lungs, in 2.8 of the cases; was greatest in the right, in 2.9; and greatest in the left lung, in 4.2 of the cases examined.

Complications.

Head.—In the first class an unusually large quantity of fluid in the ventricles of the brain was found in 4 males and 2 females, accompanied with softening in No. 532, and scrofulous matter and tubercles in Nos. 651, 659, and 534, to which the microscopical examination by Mr Gulliver has been appended.

In the second class, caries of the skull in 1 female, No. 667; a tumour attached to the *dura mater* in 1 female; congestion of the brain in 6 males and 1 female; an exsanguineous state in 1 male and 3 females; and softer than natural in 3 males and 1 female; opacity of the arachnoid in 3 males, and an unusually dry state of that membrane in 1 male; an increase in the quantity of fluid in the ventricles in 17 males and 2 females; the fluid in No. 600 was coagulable by heat and nitric acid; an apoplectic clot in 1 male; and a cyst in 1 male, No. 614, the microscopic examination by Mr Gulliver is appended to the case; a scrofulous tumour in 1 male, No. 547; in 2 males and 2 females the head was not examined.

In the third class, congestion of the brain in 2 males and 2 females; exsanguineous state in 1 female; more fluid than natural in the ventricles in 5 males and 4 females; old apoplectic cysts in 1 male; fibrine on the arachnoid in 1 female; in 4 males the head was not examined.

Chest.—In the first class, pleuritic adhesions on both sides in 2 males and 2 females; on the left side only in 1 male and 1 female; on the right side only in 1 male; acute pleuritis of the lower lobes of both lungs in 1 male; pleuropneumonia of both

lungs in 1 male; pneumonia of both lungs in 5 males and 4 females; of the left only in 2 males; of the right only in 1 male; pulmonary apoplexy and gangrene of the lung, attended with hæmoptysis, in 1 female, No. 658; scrofulous bronchial glands in 5 males and 3 females; a scrofulous substance in the situation of the thymus gland in 1 female, No. 654.

The second class.—Pleuritic adhesions on both sides in 57 males and 27 females; on the left side only in 10 males and 5 females; on the right side only in 4 males and 3 females; recent pleuritis of both lungs in 1 male and 2 females; of the left only in 3 males and 3 females; of the right only in 5 males and 4 females; hydrothorax in 4 females; ulceration of the larynx in 7 males and 3 females; pneumothorax on the right side in 1 male, No. 569, and on the left side in 1 male, No. 552; pleuropneumonia on the right side in 4 males and 1 female; on the left only in 1 male; on both sides in 1 male; acute pneumonia of both lungs in 4 males and 1 female; of the right lung in 6 males and 2 females; of the left in 2 females, chronic pneumonia was very frequent; gangrene of the right lung in 1 male and 2 females; emphysema and bronchitis of both lungs in 15 males and 4 females; of the right lung in 6 males and 3 females; of the left lung in 6 males; scrofulous bronchial glands in 3 males; enlarged thyroid gland in 1 female; osseous plates in the anterior mediastinum in 1 female, and in the diaphragm in 1 male; recent pericarditis in 4 males and 2 females; of old standing in 3 males; *foramen ovale* patent in 1 male and 1 female; aneurism of the arch of aorta in 1 female, No. 708.

The third class.—Pleuritic adhesions on both sides in 13 males and 10 females; on the right side only in 1 male and 2 females; on the left only in 5 males and 2 females; recent pleuritis on both sides in 1 female; on the right only in 1 female; pneumonia of both lungs in 3 males and 2 females; of the right lung in 3 males and 2 females; of the left lung in 1 male and 1 female; pleuropneumonia of the right lung in 1 female; emphysema and bronchitis of both lungs in 6 males and 5 females; of the right lung in 4 males; spine curved in 1 male.

Abdomen.—In the first class.—Mesenteric glands enlarged, and some scrofulous, in 9 males and 5 females; spleen tubercular or scrofulous in 4 males and 3 females; liver scrofulous in 2 males and 2 females. The liver was proved to be fatty in 1 male and 1 female; kidneys scrofulous in 2 females; the right one wasted in 1 male; a renal calculus in 1 female, No. 656. Peritoneum scrofulous in 1 male and 2 females; intestines diseased in 4 males and 1 female; hip-joint scrofulous in 1 male. The second class.—Intestines ulcerated in 17 males and 10 females; in 6 males and 6 females the ulceration was confined to the great intestines; in 4

males and 1 female to the small intestines, and in 7 males and 3 females, both the great and small intestines were diseased; congestion of the mucous membrane in 3 males and 2 females; invagination in 1 male, No. 550; healthy in 15 males and 5 females; not examined in 6 males and 4 females; peritoneal adhesions in 2 males and 1 female; scrofulous peritoneum in 4 males and 1 female; mesenteric glands enlarged and scrofulous in 4 males and 2 females; contained black matter in 1 male, No. 570. Spleen; abnormal adhesions in 2 males; enlarged in 57 males and 26 females; smaller than the average in 11 males and 13 females. The largest spleen was 33 ounces, and the smallest 1½ ounce. Liver; enlarged in 45 males and 23 females; smaller than the average in 12 males and 10 females; fatty in 4 males and 5 females; scrofulous in 2 males and 1 female; cirrhosis in 5 males and 1 female; congested in 3 males; waxy appearance in 2 females; one of these livers weighed 130 ounces. Kidneys; enlarged in 63 males and 30 females; smaller than the average in 12 males and 6 females; granular, and containing cysts, in 3 males and 1 female; scrofulous in 1 male and 1 female; left kidney absent in 1 female, No. 672; lithic acid in 1 female; renal capsule scrofulous in 1 female, No. 662; cystitis and stricture of urethra in 1 male.

Uterus; tumours in 3; cancerous ulceration in 1; a clot of blood in the ovary in 1, No. 703; scrofulous tubercles general in the organs in 1 female, No. 683; anchylosis in 1 female; iliac veins blocked up by fibrine in 1 male and 1 female, with central softening in No. 609; lymphatic gland ossified in 1 male, No. 594.

The third class.—Peritonitis in 2 males and 1 female; ulceration of the intestines in 4 males and 5 females; colitis in 1 male and in 1 female; dark matter on mucous membrane in 1 male; intestines healthy in 3 males and 2 females; not examined in 2 males; serous cysts in the mesentery examined by Mr Gulliver, No. 640; osseous points in the mesentery, No. 714; a tumour attached to the omentum, No. 719; a carcinomatous mass in the abdomen, No. 721.

Spleen; enlarged in 7 males and in 4 females; smaller than the average in 9 males and in 8 females.

Liver; enlarged in 7 males and in 2 females; smaller than the average in 9 males and in 10 females; fatty in 2 males and 4 females; tubercular in 1 female.

Kidneys; enlarged in 8 males and 3 females; smaller than the average in 4 males and 10 females; granular in 1 male; containing lithic acid in 1 male; scrofulous in 1 female, No. 724.

Uterus; tumour in one case only.

The vastly greater tendency in children than in adults to the diffusion of scrofula through the other organs generally, beside

the lungs, is very obvious, as it was found in two-third the male, all the female children, and only in 10 to 11 per cent. the adults of both classes; it affected the mesenteric glands in 52 per cent. the children, the bronchial glands in 33 per cent., the spleen in 25 per cent., liver in 14 per cent., brain in 11 per cent., other organs and parts in 22 per cent.

The mesenteric glands were scrofulous in 3½ per cent. the adults, the bronchial glands in 2¼ per cent., liver in 2¼ per cent., other organs and parts in 1¾ per cent.

Knee-joint; ulceration of the cartilage in 1 male.

In addition to the organic changes just enumerated; in the first class, there were convulsions in 1 female, hæmoptysis in 1 male and 1 female, measles in 3 males, hooping cough in 1 male, diarrhœa in 3 males and 1 female; among the second class, delirium in 5 males, paralysis in 2 males and 1 female, convulsions in 1 male, epilepsy in 1 female, hæmoptysis in 23 males and in 8 females, (in 4 males it was ascertained there had been no hæmoptysis,) dropsy in 8 males and in 6 females, albuminous urine in 1 male, rheumatism in 3 males; the third class, diarrhœa in 1 male and in 2 females, tympanitis in 2 females, dropsy in 2 females.

Chronic pneumonia was a very frequent attendant, generally in the form of a gray or fawn-coloured* indurated state of the pulmonary tissue, around the tuberculous masses and cavities, which, probably, was caused by the irritation of the tubercles. In some instances the pulmonary tissue around the tuberculous masses and cavities was free from disease. This has occurred in children where other organs besides the lungs have been studded with tubercles; in cases, too, where cavities were found lined by a membrane, the induration, when it existed, was usually more limited in extent. Such cavities have been sometimes filled by a flaky purulent fluid; when of smaller size, with cheesy matter; when still smaller, with earthy matter, and of a mixed character. The earthy matter has been found loose in cavities of considerable size.

These different conditions of the contents of the cavities all seem to bear relation towards the natural process of cure of the disease. For it has not been uncommon to find in the apices of the lungs, generally of old persons, pleuritic adhesions, a puckering and opacity of the pulmonic pleura, the structure of the lung of an irregular knotted feel, when cut into, of a dark colour with a white gritty substance in its centre, usually combined with an emphysematous state of the organ. This, connected with the duration of illness in phthisis combined with emphysema, would lead to the inference, that emphysema has a tendency to retard

* Mr Gulliver made numerous observations on the minute structure of the brown and red consolidations of lung. The results will be found in his Notes, Edin. Med. and Surg. Journ., No. 156; and illustrated by figures, in the Med. Chir. Trans. of London, Vol. xxvi.

the progress of phthisis, and as the former disease is not, in itself, believed materially to shorten life, means used artificially to produce this state of lung might perhaps have a tendency to retard the progress of the disease.

The following case, which recently occurred, seems to be one in point. A wheelwright, aged 32 years, was admitted into this Infirmary, and died in three days afterwards. He had cough and occasional hæmoptysis for the last three years, and had been a patient here for five weeks, (18 months ago,) at which time he had pulmonary tubercles, enlargement and palpitation of the heart; he went out relieved, but had not since been able to work at his trade. The body was examined; the left side of the chest very much contracted; entire of left lung indurated; several tubercles, one the size of a large pea, in a cavity lined by a membrane, some small tuberculous excavations in the upper lobe; no softened tubercles; the left lung appeared to have been for some time perfectly useless for the purposes of respiration. The right lung extended in front of the pericardium, did not collapse, appeared to be nearly double the natural size, and was generally emphysematous; in the apex was a cavity lined by a membrane filled with cheesy matter, the bulk of a walnut; several small hard tubercles in the upper lobe; bronchial tubes loaded with muco-purulent matter; redness of lining membrane. The heart was greatly enlarged, its cavities dilated and filled with fibrine of a pale colour in the right side; its weight, 21½ ounces.

In this case the enlarged heart, coupled with the bronchitic attack of his only remaining emphysematous lung, appeared to be the cause of death; the tubercular disease having been to all appearance for some time quiescent and in progress of cure.

Duration of illness, and time under treatment.

In the second class, 56 males had cough, (accompanied with hæmoptysis in 11,) for periods varying from 2 to 60 months previous to admission, average duration, 11½ months; 20 females had cough from 6 weeks to 36 months previous to admission, the average duration nearly 10 months in each; in 2 males cough had existed for 7, in 1 for 9, and in 1 for 14 years; as these were probably bronchitic cases in the first instance, they have been excluded from the average: in one of them hæmoptysis came on 4 years before admission.

The time under treatment in 69 males varied from 1 to 182 days; average, 33¼ days; in 35 females it varied from 3 to 196 days; average, 52¼ days for each.

In the third class, 3 males had asthmatic cough for several years, and in 1 it had been very troublesome for 10 weeks previous to admission; in 3 females the average duration of the

cough was 4 months; average time under treatment of 7 males 38⅓ days, and of 6 females, 44¾ days.

Occupations.—Of 49 males belonging to the second class as follows: servants, 9; coach and cab drivers, 9; stablemen, 2; carter, 1; porters, 3; labourers, 12; bricklayer, 1; scavenger, 2; hawker, 1; whitesmith, 1; coach-builder, 1; painters, 2; tinker, 1; tailors, 2; shoemaker, 1; hairdresser, 1. Of 16 females belonging to the same class: servants, 5; charwomen, 3; basketwomen, 2; laundress, 1; sempstresses, 5; of these, 7 were single, 6 married, and 3 widows.

TABLE G.—Showing the age, sex, and number in each class of 206 cases of pulmonary phthisis examined in 3 years, 1840–42 inclusive.

1st Class.

Age.	M.	F.
Under 12 months,	4	2
From 1 to 2 years,	2	3
2 to 3 .	4	0
3 to 7 .	6	3
7 to 11 .	2	1
Total,	18	9

2d Class.

Age.	M.	F.
From 11 to 20 years,	2	3
20 to 30 .	18	10
30 to 40 .	24	14
40 to 50 .	31	19
50 to 60 .	18	4
Total,	93	50

3d Class.

Age.	M.	F.
From 60 to 70 years, .	11	8
70 to 80 .	6	5
80 to 90 . .	3	1
90 upwards, . .	1	1
Total,	21	15

The males have exceeded the females in the proportion of 1.795 to 1.

The period of life most obnoxious to this disease has been from 30 to 50 years.

The period most exempt from it under twenty years in both sexes.

The average duration of life in 132 males, was 39 years and 1 month; and in 74 females, 39 years and 7 months.

AVERAGE WEIGHT OF EACH ORGAN IN OUNCES AVOIRDUPOIS.

In the second class; the brain, in 88 males, was 46.34 ounces; in 48 females, 42.5 ounces. The cerebrum, in 70 males, was 40.64 ounces; cerebellum, 4.92 ounces; and medulla, 0.9 ounce; in

38 females, the cerebrum, 37.27 ounces; cerebellum, 4.67 ounces; and medulla, 0.83 ounce.

Heart.—In 91 males, was 9.81 ounces; in 50 females, 8.58 ounces.

Right Lung.—In 79 males, 37.11 ounces; in 39 females, 25.98 ounces.

Left Lung.—In 78 males, 35.1 ounces; in 39 females, 24 ounces.

Liver.—In 90 males, 54.63 ounces; in 49 females, 51.82 ounces.

Spleen.—In 91 males, 7 ounces; in 49 females, 5.94 ounces.

Stomach.—In 88 males, 5 ounces; in 49 females, 5 ounces.

Pancreas.—In 87 males, 3 ounces; in 47 females, 2.86 ounces.

Kidneys (both.)—In 91 males, 11.1 ounce; in 47 females, 9.69 ounces.

Renal Capsules (both.)—In 30 males, half an ounce; in 26 females, half an ounce.

Uterus.—In 45 cases, 1.74 ounces.

The third class: Brain.—In 20 males, 46.13 ounces; in 15 females, 41 ounces. The cerebrum in 16 males, 39.5 ounces; cerebellum, 5 ounces; and medulla, 0.98 ounce; in 9 females, the cerebrum, 35.97 ounces; cerebellum, 4.36 ounces; and medulla, 0.8 ounce.

Heart.—In 21 males, 10.84 ounces; in 13 females, 7.4 ounces.

Right Lung.—In 20 males, 33.21 ounces; in 14 females, 23.71 ounces.

Left Lung.—In 20 males, 31 ounces; in 13 females, 20.23 ounces.

Liver.—In 20 males, 44.98 ounces; in 14 females, 41.42 ounces.

Spleen.—In 21 males, 4.32 ounces; in 15 females, 4.5 ounces.

Stomach.—In 21 males, 5.25 ounces; in 15 females, 4.51 ounces.

Pancreas.—In 21 males, 2.94 ounces; in 15 females, 2 ounces.

Kidneys (both.)—In 21 males, 9 ounces; in 15 females, 7 ounces.

Renal Capsules (both.)—In 16 males, 0.51 ounces; in 12 females, 0.5 ounces.

Uterus.—In 15 cases, 1.26 ounces.

Effects of age upon the weight of the organs.—From a comparison of the organs in the second and third classes, a diminution of their weight in the latter is evident. This would seem in great measure to be dependent on age, as it has almost invariably been found greatest in persons farthest advanced in life.

In the third class the diminution of the weight of the brain was a quarter of an ounce in the male, and 1½ ounce in the female; the decrease was confined to the cerebrum in the male, but in the fe-

male there was also a slight decrease in the cerebellum. The heart was an exception, as in the males of the third class it was one ounce heavier than in those of the second class, which may be owing to several cases of asthma and enlarged heart having terminated in pulmonary phthisis; in the female, the heart was one ounce smaller in the third than in the second class.

Right lung, in the third class, 4 ounces smaller in the males, and 2 ounces smaller in the females. Left lung, 4 ounces smaller in the males, and 3¾ ounces smaller in the females.

Liver nearly 10 ounces smaller in the males and 10¼ ounces in females; spleen smaller by 2¾ ounces in males and 1½ in females; stomach was 1½ smaller in females; the pancreas was also ¾ ounce smaller in females; kidneys 2 ounces smaller in the males and 2½ ounces in the females; uterus, ½ ounce smaller in the third class.

Weights of the organs in the adult males and females compared.

Brain in the male,	3¾ ounces heavier than in the female,	2d class.
Do.	5	3d
Heart,	1¼	2d
Do.	3, nearly	3d
Right lung,	11¼	2d
Do.	9½	3d
Left lung,	11	2d and 3d
Liver,	3¼	2d
Do.	3½	3d
Spleen,	1	2d and 3d
Stomach,	¾	3d
Pancreas,	¼	2d
Do.	1	3d
Kidneys, (both)	1¾	2d
Do.	2	3d

All the organs in the adults of both classes, when compared with the standard of the same organs in health, (as given in the Edinburgh Medical and Surgical Journal, No. 147,) will be found to be heavier, more especially the lungs, which in the males exceeded the healthy standard by 22 ounces, and in the females by 15 ounces.

Weight of the body; in 103 adult males, mean, 90.25 pounds, and in 64 adult females, 78 pounds.

Height of 108 adult males, mean, 5 feet 7 inches, and of 63 adult females, 5 feet 2 inches.*

* The mean height of 141 adult male paupers, measured by Mr Hutchinson in the Mary-le-bone Workhouse, was a little more than 5 feet 3 inches, and their mean weight 134 pounds. The mean height of the male consumptive patients has been nearly 4 inches more, and their weight nearly one-third less. From which it would appear that tall persons are most subject to consumption; and that the immense

TABLE H.—Showing the distribution in each *month* during *three years* of 206 male and female cases of pulmonary phthisis: examined in 1840–42 *inclusive.*

		M.	F.	
January,	1840,	3	3	
	1841,	1	1	
	1842,	5	0	
	Total,	9	4	13
February,	1840,	2	1	
	1841,	1	1	
	1842,	6	1	
	Total,	9	3	12
March,	1840,	3	3	
	1841,	3	1	
	1842,	4	0	
	Total,	10	4	14
April,	1840,	6	4	
	1841,	1	3	
	1842,	3	0	
	Total,	10	7	17
May,	1840,	7	2	
	1841,	4	6	
	1842,	7	2	
	Total,	18	10	28
June,	1840,	4	1	
	1841,	4	0	
	1842,	5	5	
	Total,	13	6	19
July,	1840,	6	0	
	1841,	2	0	
	1842,	1	1	
	Total,	9	1	10
August,	1840,	2	2	
	1841,	1	0	
	1842,	3	2	
	Total,	6	4	10
September,	1840,	3	1	
	1841,	5	3	
	1842,	6	1	
	Total,	14	5	19
October,	1840,	2	4	
	1841,	3	4	
	1842,	3	4	
	Total,	8	12	20
November,	1840,	6	1	
	1841,	3	6	
	1842,	3	2	
	Total,	12	9	21
December,	1840,	2	4	
	1841,	9	3	
	1842,	3	2	
	Total,	14	9	23

Most males have been examined in May, and females in October; the fewest males in October, and fewest females in July.

TABLE I.—Proportion of the above cases examined in the *separate quarters* of each year.

Years.	Spring. M.	Spring. F.	Summer. M.	Summer. F.	Autumn. M.	Autumn. F.	Winter. M.	Winter. F.	Males.	Females.	Total.
1840,	16	9	12	3	11	6	7	8	46	26	72
1841,	8	10	7	0	11	13	11	5	37	28	65
1842,	14	2	9	8	12	7	14	3	49	20	69
Total,	38	21	28	11	34	26	32	16	132	74	206

The largest numbers have been examined in the spring and autumn quarters; most males in the spring, and most females in the autumn. The smallest number of both sexes in the summer.

In the year 1842, the greatest number of males have been examined; of females in 1841; and of both combined in 1840.

loss of weight, is in the muscular structure, the several tissues, and frame-work; as it has been just shown that the internal organs were all heavier than the healthy standard.

Return from the Lying-In Wards of the St Mary-le-bone Infirmary, for the years 1841–42–43.

Ages.	Married.	Single.	Children previously born. Alive. M.	Children previously born. Alive. F.	Children previously born. Still-born. M.	Children previously born. Still-born. F.	Miscarriages.	Children born. Alive. M.	Children born. Alive. F.	Children born. Dead. M.	Children born. Dead. F.	Character of Labour. Natural. No.	Character of Labour. Natural. Aver. duration in hours.	Preternatural.	Tedious.
16	—	1	—	—	—	—	—	—	1	—	—	—	24	1	—
17	—	4	—	—	—	—	—	2	2	—	—	4	9¾	—	—
18	1	11	—	—	—	—	1	4	6	—	1	10	8	—	2
19	4	27	—	2	—	—	1	12	14	3	4	23	11¼	3	5
20	8	27	1	1	1	—	3	14	16	4	—	26	13⅞	4	5
21	8	32	5	5	1	1	5	24	13	1	1	32	10¼	2	6
22	11	43	5	6	4	2	1	6	36	4	3	49	10¼	2	3
23	17	30	6	4	2	1	4	19	24	2	—	36	9¾	2	8
24	14	27	14	11	5	1	5	22	14	1	3	34	9⅛	1	6
25	17	30	15	18	1	2	—	20	21	2	5	36	10¼	6	5
26	16	23	21	11	2	8	8	17	19	1	1	32	10¾	3	4
27	5	18	11	6	2	1	—	15	11	—	1	24	10	—	3
28	11	20	17	13	5	3	9	15	16	1	1	23	12¼	2	6
29	11	7	8	9	3	2	1	7	9	1	—	11	10	1	1
30	32	17	31	43	27	16	14	19	27	1	2	46	10¾	—	3
31	5	3	13	3	1	2	1	7	1	—	—	7	8¼	—	1
32	5	6	10	12	3	4	2	2	9	—	—	10	11⅛	1	1
33	8	2	7	7	1	—	2	6	4	1	—	10	7⅛	—	—
34	5	6	11	6	1	1	1	3	6	1	—	9	7	2	—
35	7	7	14	12	6	5	2	9	6	—	1	13	9¾	1	—
36	7	2	12	9	5	2	1	4	3	1	—	9	12	—	—
37	1	1	—	2	1	2	1	2	—	—	1	1	14	1	—
38	12	2	32	30	16	15	10	8	3	—	2	12	9⅛	1	1
39	3	—	11	10	3	1	4	2	1	—	—	3	9¼	—	—
40	6	—	13	22	4	10	1	4	3	—	—	6	9	—	1
42	2	—	7	6	—	1	1	1	1	—	—	2	13⅛	—	—
44	1	—	3	6	1	—	1	—	1	—	—	1	12	—	—
	220	346	267	254	95	80	79	244	266	24	26	469	10¼	33	61

A return from the lying-in wards, for 1840, has already been published in No. 151 of the Edinburgh Medical and Surgical Journal, in which year 143 women were delivered.

According to the present return for the three succeeding years, 572 women have been delivered; 168 in the year 1841, 212 in the year 1842, and 192 in the year 1843. The single women, as before, have been most numerous; of the 572 women, 347 were single, 220 married, and 5 were widows.

Ages at which 179 of the women were married.

1 of them at 15 years.			19 of them at 21 years.			4 of them at 27 years			
12	.	16 do.	15	.	22 do.	4	.	28 do.	
14	.	17 do.	13	.	23 do.	3	.	29 do.	
15	.	18 do.	11	.	24 do.	2	.	30 do.	
20	.	19 do.	10	.	25 do.	2	.	31 do.	
22	.	20 do.	9	.	26 do.	4	.	32 do.	

Children previously born.—Among 181 of the married women, there had been 61 miscarriages, and 528 children; of

these, 201 males and 197 females were born alive; and 68 males and 62 females still-born.

Among 103 of the single women there had been 18 miscarriages, and 168 children; of these, there were 66 males and 57 females born alive; and 27 males and 18 females still-born.

Children born.—There was about 8 per cent. more females than males born alive, some prematurely; 23 died at periods varying from 10 hours to 21 days after birth. 39 of the married and 244 of the single women had never born a child before.

Average weight of the infants of	131 married women,		7 lbs. 2 oz.
Do. Do.	209 single women,	.	6 lbs. 10 oz.

Five infants were affected with colic or diarrhœa, 2 with convulsions, 3 with cough, 6 with purulent ophthalmia, 3 with excoriation of the nates, 1 with syphilis, and 8 with thrush. Two more born with imperforate anus, one of them died. Ten per cent. of both males and females were still-born.

Character of Labour.—In 530 cases the presentation was natural; in 33 cases, preternatural; and in 9, not noted. Among the preternatural cases, 8 were of the breech, 18 footling, 3 funis, 2 arm, 2 placenta; in one case of deformed pelvis, embryotomy was performed. Labour was induced in one case of deformed pelvis, at the second month of utero-gestation, embryotomy having been required on a former occasion; the child was still born.

In the 61 cases of tedious labour, the time varied from 25 to 72 hours; the average period for each was 38½ hours.

Average duration of the natural labours, 10¾ hours.

Membranes ruptured: the average time before delivery was about 3½ hours, in 643 cases.

Placenta detached: in 646 cases, the average time after delivery was 34 minutes. Hour-glass contraction of the uterus, with retained placenta, occurred in three cases; in two of these, the placenta was adherent.

Complications attendant on labour.—Uterine hemorrhage occurred in 8 cases; vomiting during labour in 2; puerperal fever in 8; common fever in 4; leucorrhœa in 2; hæmorrhoids in 2; catarrh or bronchitis in 27; sore throat in 1; dyspepsia in 2; inflamed breasts in 14; excoriated nipples in 6; ulcerated legs in 2; rheumatism in 2; syphilis in 4; epilepsy in 1; convulsions in 2; puerperal mania in 2; cephalalgia in 2.

Mortality.—During the 3 years, 8 women died, 6 from puerperal peritonitis; in 1 of these the placenta was adherent*; 1 was asthmatic and dropsical, and had flooding upon two occasions;† in 1 it was combined with pleuritis.‡ One affected with ascites died suddenly of apoplexy during labour; the child was immediately ex-

* Vid. case 105, Pathological Contributions, Edin. Med. and Surg. Journal, No. 152.

† Vid. case 502, Do. No. 156. ‡ Vid. case 500, Do. No. 156.

tracted by the Cæsarean section, but was dead; 1 died from exhaustion a few hours after delivery, having had frequent attacks of hæmorrhage during the last three months of utero-gestation.*

The deaths which have occurred among the lying-women for the last four years have been as 1 in 71, or 1.39 per cent.

Art. II.—*On the Comparative Value of the Preparations of Mercury and Iodine in the treatment of Syphilis.* By Edward Octavius Hocken, M. D., &c., Physician to the Blenheim Street Infirmary.

In no science is an unprejudiced condition of mind more valuable and necessary than in medicine; such a philosophic bearing of the understanding, that whilst, on the one hand, preconceived opinions, the weight of authority, and the deeply imprinted peculiarities of education, do not blind us to the force of accumulated and well-attested facts, (which we may denominate, par excellence, truth) so, on the other hand, that we be not turned about "with every wind of doctrine," nor admit as certain any thing which has not undergone the full trial and assent of experience. There are, however, many people who, if they can find faults in any system, are not content to correct what they find amiss, but blindly endeavour to destroy, and not to amend; and forthwith set about establishing some theories of their own instead, however absurd the novelty itself may prove, and however inferior even their corrections may seem to unprejudiced minds. These people see only the failings of what they condemn, but are blind to their own presumption; they never stoop to institute a comparison between the two, but exposing only the former, they denounce the whole as false, and as every system contains more or less error, (however much truth may preponderate) there must be always some ground for complaint. We see these facts illustrated in the treatment of syphilis; for it was no sooner determined that a profuse and indiscriminate employment of mercury proved highly injurious in some cases, than men ran to the opposite extreme of discarding mercury altogether, and trusting to measures, in many cases, quite inadequate to fulfil the intentions of the prescribers. It is not until recently that the happy mean has been duly appreciated, and acted upon. Undoubtedly, as Mr S. Cooper remarks, the first essential step to the elucidation of the subject is, the subversion of every doctrine, relative to it, which is repugnant to general experience. In the present day it is no longer necessary to accumulate facts in order to prove that mercury is

* Vide case 492, Pathological Contributions, Edin. Med. and Surg. Journal, No. 156.

not essential to cure syphilis, and that the older doctrines of this mineral being a *sine qua non* in every stage, in every form, and under all circumstances—without which the disorder would proceed from bad to worse—were fallacious. Still the fact which experience has taught us, that syphilis may be cured without mercury, by no means proves that it is thus treated with the most advantage to the patient, and cannot possibly warrant any one to discard so valuable a remedy, for as well might blood-letting be discarded from the treatment of pneumonia, based on the fact that some patients had recovered under the employment of tartar-emetic internally, without the use of venesection. The comparative value of mercury and iodine over other forms of treatment, their separate applicabilities, and the comparative values of the different preparations of these medicines, are questions of infinite importance, to be answered by an appeal to experience alone; accordingly, in my following remarks, I shall appeal to, and contrast, the opinions of Lawrence, Guthrie, Cooper, M'Gregor, Franklin, Wallace, Ricord, Bacot, Mayo, Parker, Delpech, Cullerier, Desruelles, Hunter, Carmichael, Key, Reynaud, Williams, Colles, Ferrall, Biett, Rose, Hennen, Travers, and Sir A. Cooper, &c. &c., endeavouring to arrive at the truth by avoiding the extremes of each party, and appealing to my own experience, as far as my opportunities of observation have enabled me to judge.

I attach very considerable importance to the views of Wallace, although he has probably carried his opinions too far, from the manner in which he conducted his investigations. He remarks, that during the earlier period of his investigation of the venereal disease, all the measures employed were in conformity to the general principles of medicine and surgery, totally abstracting from consideration every idea of the disease possessing specific characters, or requiring a specific course of treatment. After this practice had been pursued for a sufficient time to fulfil the objects in view, various other plans of treatment, suggested by previously acquired knowledge of the advantages and disadvantages of mercury, &c., were tried, and by degrees that recommended by him was adopted, from a full conviction of its being, on the whole, the most secure and satisfactory.* The main points in the use of mercury and iodine are, to know when to employ them, and when to refrain. In this, as Dr Wallace justly remarks, consists, if not the whole, at least the principal difficulty in the treatment of the venereal disease, (p. 104.) To ascertain these desiderata, it will be necessary to consider in detail the various stages, and phenomena, of the venereal disease; regarding the term syphilis as synonymous with the venereal disease, and as including all those affections which originate from promiscuous sexual intercourse. I shall consider my subject under the three following headings:—

* Treatise on the Venereal Disease, &c. p. 5. Preface.

First, The comparative value of mercury and iodine, and that of the simple treatment.

Second, The comparative value of mercury and iodine in the treatment of the different forms and stages of syphilis.

Third, The comparative value of the different preparations of mercury and iodine, and the best modes of their employment.

1*st*, Is the plan of treatment by mercury and iodine in syphilis superior to any other mode?

When we bear in mind the unwarrantable length to which the mercurial treatment was formerly carried, and the very severe symptoms which resulted from such an use of this remedy, either in connection with, or independently of, the disease, we can hardly be surprised at finding M. Broussais stating, in 1815, "that the remedies termed anti-syphilitic should be administered internally with caution, otherwise they commonly produce gastro-enteric affections, which exasperate the primitive disease; the revulsive action of the remedies is thus prevented, irritation is set up in the viscéra, which terminates ultimately in their disorganization." The disadvantages of such an use of mercury tended in no slight degree to place the simple treatment in a very advantageous point of view. But, in modern practice, where we acknowledge and eschew the errors of a previous generation,—errors which trammelled even the mighty genius of a Hunter,—we administer mercury in such doses, and at such intervals, as reason, not prejudice, dictates; guided by its effects on the symptoms, the states of the disease, and the constitutional condition. It is this mild use of mercury that I shall consider in the subsequent pages. No doubt, says Dr Wallace (p. 102,) very great mischief has resulted in the practice of routine practitioners, from the long-formed and deeply-rooted opinion, that mercury was an unerring specific against every form of the venereal disease. From this opinion arose the supposition, that whatever effects the venereal poison produced were controllable by the specific, modifying or opposing influences were not taken into account; and to remove these effects it was deemed necessary only to proportion the quantity of the remedy to the obstinacy of the disease, and that these could not be controlled unless by the influence of this remedy. From these opinions the most direful consequences resulted,—consequences vastly more destructive than those produced by the uncontrolled influence of the venereal disease.

The excessive and injudicious use of mercury by no means proves a preventive of secondary symptoms. Thus, in Sweden, it was the practice, as late as 1814, to heal primary symptoms by the most free inunction, the average number of secondary affections of the bones being no less than 54 per cent. In 1814, this

treatment was changed for a more limited use of mercury, with careful diet, &c., and the number of diseased bones was reduced to about 6½ per cent. Thus, by adopting the plan of administering mercury only to the extent necessary for the cure of the primary sore, we obtain all the advantages and avoid all the evils of its excessive use.

The accumulated experience of modern practice tends to prove, that several varieties of venereal ulcers receive their complete cure with much greater rapidity under a judiciously regulated mercurial plan of treatment, and that by its influence there is a great reduction in the number of those who suffer secondarily. It is necessary to bear in mind, that chancres are not cured if any induration remains during cicatrization, or follows in the cicatrix; and these are the cases in which, if mercury be not essential, still a cure will be effected within one-half or even one-third of the time necessary for such a termination without mercury. It is true, as Ricord remarks, that, in many cases, if, like the physiological school, we date the cure of a chancre from the period at which the ulcer is cicatrized, without regarding the consequences, the cure will apparently be more rapid under simple treatment, and in hospitals the patients are a less time under treatment. But if, in order to call a patient cured, we wait until all hardness has disappeared, we shall find an enormous difference in favour of a mercurial treatment, the induration continuing, in the first instance, an indefinite period, and giving rise much more frequently to secondary or constitutional symptoms. Ricord has recourse to mercury whenever a certain degree of induration accompanies a chancre, when it does not speedily cicatrize, or when the induration remains after its apparent cure. The evidence furnished by the medical officers of the British army during the last Peninsular War amounts to this:—That all sores are curable without mercury; that secondary symptoms occur in the proportion of at least one in ten of those cases where no mercury is used, but only in the proportion of one to seventy-five where it has been employed; that nearly all the secondary forms of syphilis may be cured without a particle of mercury; that secondary symptoms, under such circumstances, are usually mild; that, with the exception of indurated sores, and indurated cicatrices, the time required for the cure of primary sores by the non-mercurial plan was not, in general, greater than where mercury was employed. But Rose, Hennen, Guthrie, Travers, and Carmichael all contend that mercury will heal some primary sores in a few weeks, which would not have been healed by any other treatment in as many months. Dr Colles states (p. 317), that himself and colleagues tried the non-mercurial treatment till they became convinced that the patient's stay in the hospital proved in general very protracted, so that they

became impatient of the treatment, especially when they saw others in the same ward have their complaints more quickly cured by the use of mercury. The official document of Sir James M'Gregor and Sir William Franklin would indeed, at first sight, seem to prove that chancres heal sooner without than with mercury; but we must bear in mind, that most probably a great majority of the 2827 sores treated with mercury were of the indurated kind, whilst probably the majority of the 1940 sores treated without were not of this nature; and that under any treatment, but especially the non-mercurial, the duration of the induration is longer and more intractable than simple cases.

Dr Wallace has remarked, that there are not many cases in the whole range of the practice of surgery which exhibit more remarkably the beneficial influence of medicine. We shall often observe, that in twenty-four hours after a mercurial course has been commenced, the appearance of the ulcer will sometimes change, and from being of a dingy yellow or ash-coloured white, will be quickly changed to a healthy red; while this alteration of colour will be followed by a process of cicatrization, sometimes so rapid, that there is no time for a reparation of lost parts, and the process of granulation, and the sore is therefore healed with loss of substance. That any one who has carefully observed the operation of mercury upon a syphilitic sore, when this medicine is appropriately employed, should doubt its efficacy, is to me (says Dr Wallace) difficult of explanation.*

When we come to examine the arguments for and against the use of mercury in primary sores, we find the non-mecurialist stating that all forms may be cured without a grain of this mineral, and that, as secondary symptoms are rare, under these circumstances it is more judicious to abstain from its employment, because we may thereby avoid those unpleasant consequences which frequently result, often more injurious than the uncontrolled effects of the poison itself; that the more serious secondary and tertiary symptoms are not prevented; that other forms, without mercury, are mild in their symptoms, earlier in their approach, and sooner over; that they are never more severe without the use of mercury than with; that mercury does not prevent, but only lessens, the frequency of secondary symptoms.

The arguments in favour of a judicious use of mercury are, that the universal curability of syphilis without mercury does not form an objection to a mercurial treatment, as we must take into consideration the comparative values of this and other remedies and treatment, and if any counterbalancing evils result from the proper use of mercury; for we must not argue against an appropriate use of a remedy, by adducing consequences which may

* Loc. cit. pp. 100–1.

arise from its improper or injudicious administration. The careful use of mercury is never injurious in a good constitution. Secondary symptoms are less frequent, and last as long without, as with, mercury. Mr Rose says, one out of three, cured without mercury, were followed by secondary. In indurated chancre, it is agreed by all that the period of recovery is shortened, and the sore healed thoroughly and soundly. Since syphilis can be cured more rapidly with mercury than without it, and since no inconveniences result from a properly directed administration of this medicine, we have the same reasons for using it in primary syphilis as we have for using any other remedy in any other disease. We do not in general employ medicines from a conviction that the diseases for which they are employed would be incurable without them, but because we know from experience that the cure of disease is often rendered more rapid by a judicious interference of art. Exactly the same principles should guide us in the treatment of primary syphilis.

As regards the comparative value of iodine, it is most remarkable that it is the forms of venereal disease, as Dr Wallace* says, to which mercury is least suited, over which the iodine acts as an heroic remedy, thus, as it were, completing our circle of therapeutic agents for every form of venereal disease. There is not in the Materia Medica any other medicine which is at once so beneficial as a therapeutic agent, and so little injurious to the system when properly employed. Ricord's opinion is to the same effect; viz. that where mercury ceases to be efficacious, the iodide of potassium proves the most valuable and efficacious remedy. But there are also mixed cases, in which both secondary and tertiary symptoms are combined, and in these a combination of mercury and iodine proves most beneficial. To ascertain the comparative value of mercury and iodine in syphilis, I must proceed to inquire into—

Secondly, the comparative value of mercury and iodine in the treatment of the different forms and stages of syphilis. To come to a satisfactory conclusion on these several points, it will be necessary to consider consecutively the various forms of primary, secondary, and tertiary syphilis, as far as their comparative treatments by mercury and iodine are concerned. As a general fact, we may state that a modified mercurial treatment is applicable to the primary and secondary forms, whilst the iodide of potassium exerts the most beneficial and undoubted influence in the tertiary, viz. the diseases of the periosteum and bones, and the tubercular affections of the skin, cellular, and sub-mucous tissues. M. Ricord considers mercury to be more frequently injurious than useful in primary syphilis, except in the indurated forms. On the

* Lancet, p. 11, Vol. ii. 1835–6.

contrary, that it is absolutely necessary in the secondary. Where the tertiary alone exist, he has recourse to the iodide of potassium, beginning with doses of ten grains in the following manner:

Aquæ dist. ℥iii; *Potassæ Iodidi*, x grs.; *Syrup. Papav.* ℥i.

This potion is taken in three doses during the day with sarsaparilla, the quantity of the iodide being gradually increased.

In commencing the consideration of the primary forms of syphilis, and the comparative applicabilities of mercury and iodine, I may state that Ricord has proved, to our satisfaction, that there is not a plurality of poisons, by his masterly employment of inoculation as a test. Inoculation proves, that, whatever may be the actual character, appearance, or situation of the chancre from which purulent matter is taken, so that it be during its incipient stages—those of ulceration and indolence—a regular pustule is obtained, when the matter is introduced beneath the epidermis or epithelium; an ulcer, when applied to a denuded surface; and an abscess, when introduced into the cellular tissue or lymphatic system. Regarding these as the types of uncomplicated primary syphilis, mercury is undoubtedly the best remedy, since all the experience accumulated in this branch of practical surgery tends to prove, that a regular or sthenic syphilis, attended by induration, is most certainly, expeditiously, and effectually cured by a mild and judicious employment of this mineral; but a variety of contingent circumstances may so alter the developement and symptoms of the disease, as to render the use of mercury injudicious or even hazardous. Acording to Ricord, the characters which chancres display are due to circumstances unconnected with the specific cause which produced them; these are principally constitutional conditions and peculiarities, mode of living, the influence of precedent or present disease, the local treatment of the sore, its situation, and the patient's conduct since the receipt of infection. It is from the simple or combined agency of these causes that we see phagedenic ulcers in subjects who have contracted their disease from others affected with sores of the simplest character.

In considering the applicability of mercury and iodine in the treatment of the different forms of primary syphilis, it will be well to possess some simple but practical division of these sores, in which I shall mainly trust to what I have observed myself. I shall consider them under the heads of simple chancre, characterized rather by negative than positive characters; 2. simple ulcers with an excess of inflammatory action; 3. simple ulcers with an excess of irritability; 4. the indurated or Hunterian ulcer, and those which have become indurated by fortuitous circumstances; 5. the phagedenic, and sloughing phagedenic sores. It is well also to remember the different stages which chancres

present: the periods of formation, ulceration, indolence, granulation, and cicatrization. Ricord's experiments prove, that chancres are capable of secreting a specific purulent matter only during the stages of ulceration and indolence. As a general law, mercury may be said to be injurious during the early stages, whilst they are attended with local inflammation, irritability, and general fever, remaining as long as the process of ulceration continues in active operation, and hence it should not be employed till these have been removed by low diet, repose, purging, and, in some cases, by blood-letting. In a few forms of phagedena, however, it is not advisable to wait for the subsidence of the ulceration, and, in these cases, mercury fully and freely employed is the most certain and efficacious mode of arresting its progress. Dr Wallace* found, in his practice, that it was highly improper to administer mercury internally during the early stages, for, if used at this period, it may, instead of producing a salutary and specific influence, increase the inflammation, or excite a state of irritable or indolent action, after which the system will become insensible to ordinary doses of this medicine; and if larger doses be employed, a peculiar and complex state will most probably result, determined in its character by the combined influence of the disease, the remedy, and the constitution of the patient,—a state in which mercury acts as a poison, or, in other words, not only aggravates all the symptoms, but, perhaps, excites a new train of peculiar morbid actions.

We may gather fresh arguments for the necessity of attending to the stage and condition of the sore, by considering the applicability of local mercurial remedies. Mercurial washes possess stimulating and irritating properties in different degrees, whilst practical experience has determined that all such dressings are highly injurious during the early stages, whilst the sores remain in an irritable or inflamed condition. Dr Wallace remarks, that great mischief frequently results from the topical employment of mercury, as well as other stimulants, during the stage of ulceration, by producing morbid excitement, followed sometimes by indolent, and sometimes by irritable action, with their concomitants and consequences. The most appalling forms of the disease which ever came under Dr Wallace's observation, were caused by the injudicious application of the red precipitate, or other powerfully stimulating dressings, and it was therefore long a principle with him to avoid all mercurial dressings during the ulcerating stage of syphilis. Mr Carmichael judiciously observes, that inflammation caused by neglect, imprudence, irritating applications, or the use of mercury, may so modify the natural appearance of ulcers as to render it difficult to ascertain to what class they belong. Under

* Loc. cit. pp. 109, 110.

these circumstances he recommends, instead of at once having recourse to mercury, avoiding the inextricable difficulties and embarrassments to which this rash step may lead, and to be content with directing antiphlogistic measures to the necessary extent; mild soothing applications, and rest in the recumbent position, until all inflammation is removed; and then, and not till then, can any competent judgment be formed respecting the true nature of the ulcer, and its appropriate treatment. Mr Key* thinks, that mercurial washes are especially injurious in the early stages of chancre, since under their use the ulceration is increased, and the secretion augmented. Ricord, and the French school generally, condemn the use of ointments in the ulcerating stage of primary sores. The conclusions of experience tend to prove, that, with some exceptions, mercury should never be employed, either generally or locally, during the stages of ulceration, irritability, or inflammation, and, consequently, is inadmissible in those ulcers which are characterized by an excess of either irritability or inflammation, as long as they retain these peculiarities. Mr Key mentions, as an exception, that mercurial dressings are serviceable in sores indolent not sensitive, and secreting but sparingly, although he attributes much of the troublesome career of primary sores to the premature use of mercurial applications: their injurious action, he says, is seen in the conversion of the surface into a yellowish mass,—a change which usually indicates ulceration, an increase of secretion, a disposition to spread, and an increased degree of sensibility: as soon as these applications are replaced by astringents, the changes in the appearance of the sores show on what their previous condition depended. The same facts apply to the internal use of mercury, which should be given sparingly, and cautiously watched during the ulcerative stage.

Before I pass on to discuss the treatment of simple chancre, I would say a word or two about the employment of mercury and iodine in the local and constitutional symptoms of gonorrhœa. Dr Wallace employed and recommended mercury under the persuasion that the poison of gonorrhœa and syphilis was identical, and hence he termed gonorrhœa catarrhal primary syphilis. He used this mineral till the system was brought slightly under its influence, with the object "of preventing bubo and secondary symptoms." Five grains of blue pill, with a quarter of a grain of opium twice a day for two or three weeks, appeared to Dr Wallace sufficient to afford all the assistance required, in general, for the removal of the disease, or to protect the constitution from contamination. Although we are far from thinking these views correct, and disapprove of administering mercury as a specific remedy for a specific disease, and have not forgotten the words of Sir A.

* Guy's Hospital Reports, October 1839.

Cooper, in reference to the treatment of this very disease by mercury in Guy's Hospital, that "to compel an unfortunate patient to undergo a course of mercury for a disease which does not require it, is a proceeding which reflects disgrace and dishonour on the character of a medical institution," yet we must admit that mercury, as an exception, is occasionally useful in the complications of this disease; *first*, where there is a concealed chancre; and, *secondly*, where lymph has been thrown out, endangering a stricture in protracted gleet. In Dr Wallace's time the profession did not acknowledge masked or urethral chancres, which undoubtedly exist, and the occasional presence of which would go far to explain the success which attended that gentleman's practice in some cases, and which may have induced him to give mercury as a general plan. But besides these cases of urethral chancre, I feel convinced that some chronic and protracted cases give rise to, and are more or less kept up by effusions of lymph interstitially, and into the surrounding structures; originating indurations, and incipient narrowings of the canal. Dr Wallace himself alludes to these cases, for he remarks, that when gleet or chronic gonorrhœa is connected with an indurated state of the urethra, &c. it will be prudent to submit the patient to a short course of mercury, partly because the indurated and narrowed state of the urethra often depends on the specific effects of the venereal poison, and partly because, even when this is not the case, an alterative course of mercury frequently offers the best remedy. Indeed, he adds, I have on many occasions experienced much pleasure from observing not only the gleety discharge, but also the contracted and indurated state of the urethra to disappear as soon as the patient's constitution was brought under the specific influence of mercury.

In gonorrhœal rheumatism the iodide of potassium, carefully administered in moderate doses, is by far the most valuable remedy.

In the treatment of all the simple varieties of chancre, as soon as they have assumed a quiet condition under antiphlogistic regimen, (if they do not quickly heal without further assistance,) we should have recourse to a mild mercurial course, and to the local application of black wash, with the objects of hastening the cure, and protecting the constitution. It will seldom be necessary, says Dr Wallace,* to give mercury in simple chancres to promote cicatrization, because these superficial affections are, for the most part, readily healed by simple measures; nevertheless they are sometimes found to be very obstinate, and disposed to induration and fungus until this medicine be employed; but mercury is as necessary to protect the constitution in the superficial forms, as in

* Loc. cit., pp. 228-9.

the more excavated. It is, therefore, his decided opinion that superficial syphilis should be treated by a suitable administration of mercury, with the object of protecting the constitution, and, where necessary, of promoting cicatrization.

When these ulcers are situated on the prepuce or scrotum they sometimes assume a very obstinate character, and if, in such cases, mercury, short of salivation, fails to produce a cure, it should not be persisted in, but the iodide of potassium, with sarsaparilla, be given instead, although we must confess that the iodide possesses no very evident influence over their progress. Mr S. Cooper's experience* leads him to believe that these ulcers are very slow in assuming a healing state, whatever medicine be given; that mercury, except in alterative doses, has little effect in expediting the cure, whilst salivation is quite uncalled for. He says that the iodide of potassium, or *liquor potassæ*, with sarsaparilla, is an eligible medicine.

It is an undoubted fact that the danger of secondary symptoms is in direct ratio to the duration of the primary symptoms; hence that mode of treatment should be adopted by which they are most speedily healed. But we might infer that the danger of infecting the constitution exists only during the ulcerating and indolent stages, whilst the period of healing would present no danger, however protracted; that as inoculation is inefficacious at other stages, so the patient's system would be safe: this, however, is by no means certain. In the fore-mentioned ulcers the protracted stage is during granulation, and it is during this period that judicious local measures are of much avail. In the first stage we have to do with a specific sore, both irritable and poisoned, as well as itself poisonous,—readily irritated by remedies; whilst in the second we have a simple ulcer destitute of all these traits.

Indurated Chancre.—This form of chancre Mr Hunter† described as possessing an induration which "is very circumscribed, not diffusing itself gradually and imperceptibly into the surrounding parts, but terminating rather abruptly. Its base is hard, and the edges a little prominent." But, besides the form described above, it includes prominent as well as excavated indurated ulcers, and induration of the cicatrix of previous primary sores. Almost all practitioners agree in the advantages of a full mercurial treatment, until the chancre has healed, without leaving any induration in the cicatrix. Ricord‡ asserts that mercury is as advantageous here as it is injurious in some other cases, and that the surgeon who omits a full course ought to be considered responsible for the constitutional symptoms which are almost sure to succeed it. He says, that he has invariably recourse to mercury every time that a certain induration accompanies a chancre, so as

* Dictionary, p. 1434. † Works. Palmer's Edition, Vol. ii. p. 319. ‡ P. 577.

to prevent its healing, or persists after its superficial cure, and more especially when, by its excess, it gives rise to phagedena. Mr Carmichael, who is no friend to mercury as a specific in venereal chancres, states that the remedy, in the indurated form, will remove, under a judicious use, every symptom of that disease, local and constitutional, and that mere alterative courses may suspend, but will not cure the poison altogether. Mr Guthrie's testimony is to the effect that, without the constitutional influence of mercury, various local applications seemed to produce little effect on the sores, which remained open various periods, but all very long—healing up and ulcerating again on an hardened base. Desruelles* says, that in these cases no medicine is so advantageous as mercury, and so marked are its effects that he is tempted to regard it as a specific. Mr Mayo† remarks, that in indurated chancre mercury should be commenced as soon as the character of the disease is determined. It is probable that the delay even of a few days materially lessens its efficacy towards preventing constitutional lues. For the same reason it should be given at once in quantity, and in a manner calculated to affect the system as speedily as is consistent with keeping clear of its injurious agency. Genuine indurated primary syphilis, says Dr Wallace,‡ will be found particularly well suited to mercurial treatment; for there is no medicine whose beneficial influence can in any way be compared to that of mercury in this form of disease. Mercury administered for the cure of indurated syphilis must be employed in larger doses, and continued for a longer time, than in the treatment of the regular form of this disease. Alterative doses will often be of no use, and the symptoms will frequently remain obstinate until a decidedly mercurial state of the system has been produced, after which they will rapidly disappear.

The advantages of a full mercurial course in the indurated form of syphilis is clearly proved by the united testimony of all the best modern authorities; and although this, as well as all the other forms of primary syphilis, may get well without mercury, still such a termination is uncertain, and the event prolonged,—frequently healing, and leaving its specific induration ready to reulcerate from the first exciting cause. The rule is, that mercury should be discontinued when the sore has healed, and all induration of the cicatrix has disappeared. It is of equal importance to heal radically the indurated condition of the cicatrix as the primary sore, as the patient is exposed to an equal risk, and mercury is the remedy needed. Delpech, Wallace, Ricord, and Cullerier, particularly insist on the dangerous and troublesome character of an indurated cicatrix; they regard it as denoting the persistence of syphilitic action in the system, and the forerunner

* P. 506. † P. 46. ‡ Pp. 309–10.

of accidents to come. The best treatment is a mild, continued, and carefully-regulated constitutional employment of mercury, and the avoidance of all local injury and irritation.

The foregoing observations do not apply to sores which have become indurated from mismanagement, and the injudicious use of irritating applications during the early stages. These cases are mostly attended by acute inflammation, and an inflamed areola: they demand rest, low diet, purging, and, perhaps, bleeding. If the induration remains after the cure of these symptoms, then mercury is equally efficacious in them as in those primarily indurated. Dr Wallace* says that we can always distinguish these cases by their history, and by the character of their areola. Thus, if indurated primary syphilis be not attended by inflammation or irritation, it will not be surrounded by an inflamed areola, but by a callous or livid white one, with or without a whitish line at the very edge or margin of the ulcerating surface, or else the skin surrounding the ulcer will present its natural appearance.

Phagedenic Chancre.—From what I have observed, I feel fully convinced that mercury should not be used, as a general rule, in most of the forms and stages of phagedena, but that, as the exception, it proves a most valuable auxiliary to control its ravages. Writers are divided in their opinions as to the propriety of the mercurial treatment. Messrs Carmichael and Key totally reject it. Mr Carmichael agrees with the French school in totally rejecting it as a most dangerous remedy, and attributes to its employment all the severe cases of sloughing and phagedena which occurred in the British army at the commencement of the Peninsular war, and the mildness of the disease in the Portuguese inhabitants, to their practitioners abstaining from even a single grain. Mr Key considers that mercury tends to increase the irritability, to lower the powers of the patient, and therefore quickens the phagedenic action. "Loss of rest," he says, "and the irritability of the arterial and nervous systems to which it gives rise, are the prominent points in these cases. Mr Guthrie† asserts that secondary symptoms are rare in phagedena, provided no mercury has been used. Mr Rose also bears testimony to the ill effects of mercury and stimulants, and confirms the opinion that secondary symptoms are rare. On the contrary, Dr Wallace maintains that there are many varieties of phagedena, in which mercury is so beneficial as to be almost indispensable; and, although he may have been too partial to mercury, still we are justly indebted to him for his observations on the subject. Mr Lawrence, in his lectures, is in the habit of remarking that phagedenic ulcers do not bear the general administration of mercury,

* Pp. 310–11.
† Medico-Chirurgical Transactions, Vol. viii. p. 565.

but that it does sometimes happen, that when a state of active phagedenic ulceration is going on rapidly, and parts are destroyed by it, that the progress of the disease can be arrested by the exhibition. "I acknowledge," he remarks, "it would be difficult to say precisely what is the kind of phagedenic ulceration in which you ought to use mercury, and what is the kind in which you ought not. It is a difficulty that can only be overcome by experience; but I think it right to say that there are such cases." This gentleman has often seen salivation produced accidentally by the employment of cinnabar fumigations in phagedenic ulcers of the throat, and has found not only that the local disease did well, but that the other affections of the system proceeded very favourably. M. Ricord also thinks that there are circumstances under which a mercurial treatment is followed by the best results, and this fact is constantly proved by the practice of those who are partizans of the simple treatment, and profess the greatest enmity to a mercurial treatment.

These authorities are enough to prove that mercury is occasionally a very valuable remedy in phagedena. A most important question is,—what are the states and conditions in which mercury may be advantageously used? Mr Lawrence says, that where there is a simple phagedenic state of the chancre, when there is nothing like sloughing to be observed, when there is nothing but ulcerative absorption, and the consequent destruction of parts by it, without any considerable redness or swelling in the surrounding parts, without any considerable constitutional disturbance, but the destructive process going on rapidly, it may be expedient to exhibit, and sometimes with success, an active course of mercury. Ricord divides phagedenic ulcers into three classes; the indurated, the gangrenous, from excess of inflammation, and the gangrenous, from debility or constitutional tendency. In the indurated forms, he thinks that the internal use of mercury, with soothing local measures, is as advantageous as it is hurtful in the other forms. He seems, however, to be able to lay down no rules to guide in the use of mercury in the other forms, for he informs us that he has recourse to this mineral when the chancre continues to spread in spite of careful local treatment, first locally with opium, and then internally, or by friction, but that, in the present state of science, it is impossible to state what are the precise conditions of the ulcer in which mercury is indicated. Mr Mayo* seems to follow a similar rule, when he says, "Nor must it be denied, that occasionally a short and brisk course of mercury will give a new turn to the complaint, and cause those troublesome sores at once to close. This remedy, however, should be last resorted to."

Dr Wallace, in his very able treatise, has endeavoured to lay

* P. 20.

down clear precepts, whereby we may know by the appearances and progress of the sore, whether mercury should or should not be exhibited. He believes that the confusion of the many forms of the ulcers tends to perpetuate the uncertainty of treatment, and hence has given what he believes to be a practical classification. It is as follows:

Without Slough.	With White Slough.	With Black Slough.
1. Simple.	1. Simple.	1. Simple.
2. Inflamed.	2. Inflamed.	2. Inflamed.
3. Irritable.	3. Irritable.	3. Irritable.

In the first form, the simple phagedenic sore without slough, characterized by extensive and sometimes rapid ulceration, without much inflammation or irritability, arising, perhaps, from merely an unusual persistence or activity of the specific action attendant on the ulcerating stage of primary syphilis, mercury is considered as almost indispensable by Dr Wallace,* as a form of disease not to be trifled with, who remarks, that whenever we meet with a case of simple phagedenic primary sore, if it has not been previously complicated by improper treatment, it will be necessary to subject the patient to a course of mercury, and we shall always be gratified by the result. But if, on the other hand, the patient has already been dabbling with mercurial remedies, and if there be reason to suppose that his constitution has been, in consequence, more or less disordered, we shall act more judiciously, by suspending for a time the use of mercury, and endeavour, by proper measures, but principally by attention to the mode of living of our patient, and by the use of the mineral acids with sarsaparilla, to restore the system to a state of tranquillity before we enter again on a mercurial treatment, which may, however, be then used with success. Topical mercurial applications, according to the conditions of the sore, and fumigations, are frequently of much service.

In the inflamed variety of phagedena without slough, which rarely happens but from great neglect, and in persons of good constitutions but dissolute habits, the treatment is to be directed to the subduction of the inflammation, and after the chancre has put on simple characters, it again becomes amenable to mercury.

In the irritable form mercury is always injurious, producing an increase of irritability, local and general, whilst hectic and secondary symptoms of a very unmanageable form may result. Where there is much constitutional depression and derangement, I have seen the iodide of potassium, with the general and local use of opium, of much service.

In the simple phagedenic primary syphilis with white slough, Dr Wallace states that it is always influenced in the most salutary

manner by both the constitutional and local action of mercury, wherever it may be seated, and whatever extent it may be, although the remedy is apt to disagree with those constitutions in which we see these sores. The disease itself is beneficially influenced by a judicious use of mercury; yet a prolonged employment is frequently followed by febrile mercurial irritation, succeeded, if the mercury be persevered in, by a speedy change for the worse in the condition of the ulcers, which become first stationary and sensitive, and afterwards painful and spreading, secondary symptoms of a malignant character often setting in, under such circumstances.

As regards the inflamed phagedena with white slough, we must bleed and use antiphlogistic treatment, according to circumstances; but Dr Wallace* has also come to the conclusion that mercury, if given in full doses, so as to produce its effects rapidly on the system, will control, even in its most inflamed state, the progress of this form of phagedena. Although it should not be resorted to blindly in all cases, yet in many it will afford the chief if not the only protection when the disease is making rapid progress in parts of much importance. If there be inordinate inflammation, antiphlogistics and evacuants, proportioned to the nature of the case, are to be combined with mercury, just as in cases of iritis; and having put a stop, by these combined measures, to the further extension of the disease, which is sometimes done in a few hours, the mercurial treatment should be intermitted, and the patient allowed time to recover from the excitement produced on the one hand by the disease, and on the other by the mercury. But as soon as the system and part are tranquillized, the mercurial treatment may be again resumed without fear, but in a milder form, and continued with caution as long as may be necessary. Particular attention is required to the characters of the slough at its junction with the living parts during this treatment. The distinctive features of the chancre are to be drawn from the colour of the slough at the junction of the dead and living parts, and not from its colour in other situations, where it might become black or green from accidental circumstances. Mercury should immediately be discontinued if the slough assume a dark or tawny colour from intensity of inflammation, or any other cause—if the local inflammation increases, whilst the patient is affected by mercury, or the surface become clear of slough, without any diminution of the inflammation and irritation—or, lastly, should the patient's system become deranged, whilst we find any extraordinary difficulty in exciting the mercurial action, the disease at the same time remaining stationary. Dr Wallace asserts, that although that form of inflammation which supervenes when a patient is un-

* Med.-Chir. Trans. Vol. viii. p. 168, &c.

der a mercurial course is sure to be aggravated by persisting in the use of mercury, this remedy will powerfully assist to subdue inflammation which commenced under different circumstances. Even the irritable phagedenic chancre with white slough is best treated, according to Dr Wallace, by a short but full course of mercury, if it has not been previously mismanaged. Great caution, however, is to be employed, and the remedy combined with narcotics, (a large quantity of opium, Dover's powder, &c.) and sometimes the carbonate of ammonia with sarsaparilla. An anodyne local treatment is most frequently successful. In all the forms of phagedena with white slough, therefore, Dr Wallace considers mercury, when judiciously timed, and carefully watched, as the best remedy. He speaks of these as examples of primary syphilis in an acute form, and modified by peculiar states of constitution, and says, that until our path be more clear, we shall run much less risk in doubtful cases of doing mischief by refraining from, than by employing mercury.

The simple primary phagedena with black slough is analogous to the sloughing ulcer of Bacot, being an indurated sore with black or tawny nut-brown slough, little or no surrounding inflammation, and very little insensibility. It often exhibits a disposition to be whitish at the circumference of the sore. The early stages must be treated on general principles,—nitrous or nitro-muriatic acid, with sarsaparilla internally, proves beneficial. After the first stages the actions of reparation and perfect cicatrization may be produced in it with much more certainty, and in a much shorter time, and with less expense to the constitution, by a mild and well regulated course of mercury, than by any other means. Dr Wallace allows that great caution is necessary in using mercury for this form of sore, owing to the very susceptible state of system in which it is apt to arise; and hence, he thinks, that great advantage will be derived from the occasional interposition of the remedy, and from alternating, during these intermissions, such remedies as are calculated to improve the tone of the organization, and to tranquillize the state of the nervous system. Dr Wallace has given the following distinguishing marks from the inflamed phagedena with black slough :—

Simple phagedena with black slough.	Inflamed phagedena with black slough.
1. Attended with little or no inflammation.	1. Great inflammation.
2. Attended with great induration.	2. Little induration.
3. Little tumefaction or œdema.	3. Great tumefaction, &c.
4. Sloughs principally by the surface.	4. Sloughs at margin and edge as much as on the surface.
5. Sloughs of a brownish-black colour.	5. Sloughs of a deep black.
6. Slow in its progress.	6. Rapid in its progress.
7. Not attended by great pain.	7. Often attended by great pain.

The two remaining forms of phagedena with black slough cor-

respond to the gangrenous ulcers of Mr Bacot and M. Ricord, and all experienced practitioners concur in condemning the use of mercury in them. Inflamed black phagedena is met with under very different circumstances. It may occur in the young or the old, in the robust or the debilitated, in the healthy or the unhealthy—but in all, as long as the black slough exists, it is uniformly most obnoxious to the employment of mercury. Where there is general fever and sthenic excitement, it requires free blood-letting, &c., but where there is constitutional cachexia and debility, the iodide of potassium with opium and sarsaparilla internally, with local antiphlogistics, proves most beneficial.

In the irritable phagedena with black slough, Dr Wallace says, that so long as its essential characters—irritability and extension by black slough, remain—mercury is on no account to be administered, for by it they will be uniformly aggravated. But when combined with white slough, which is much in excess, and if there does not exist a state of mercurial excitement or cachexia, produced by the previous improper employment of mercury, this medicine may be used with advantage, so far at least as that portion of the sore, which is spreading by a white slough, is concerned, provided it be given for only short intervals, but in full doses, and combined with equally full doses of opium. As Sir George Ballingall has remarked, that, in the hands of a judicious practitioner, mercury will fulfil a number of different and apparently contradictory indications, in the hands of ignorance, temerity, or indiscretion, it will do more harm than good. In these cases where there is much debility and cachexia of the system, I feel convinced that the iodide of potassium, with other measures, is a most valuable remedy.

Warts, &c.—As warts, &c. arise usually from superficial ulceration, irritation, or excoriation, it will be advisable to insert their consideration here, before I proceed to that of bubo. Dr Wallace considered warts and fungous growths from ulcers deserved a separate consideration under the head of fungous primary syphilis. Their treatment depends upon their condition, whether ulcerated, inflamed, or irritable. They must be quieted before recourse be had to removal, or the influence of stimulating applications. When indolent they may be washed with the dilute *Liq. Chlorin. Sodæ*, and then dusted with calomel. Dr Wallace recognizes fungous growths following superficial ulceration or excoriation, fibrous or warty growths, which exhibit a granulated surface, and a variety, which is flat or rounded, and comparatively even. The action of mercury is so remarkably beneficial in this last form, that it would be impossible to select a form of venereal disease better suited to demonstrate its specific influence. In fact, Dr Wallace has never seen it resist mercurial treatment, nor give the

least trouble during its cure, unless where there was gross neglect on the part of the patient. Topical mercurials would even of themselves very soon clear the affected surface, but he never depends on them alone. It is interesting to observe the rapidity with which these fungi disappear, whenever the constitution becomes affected even in the most trifling degree by mercury. Warts removed, before the system has been affected by mercury, are very apt to be reproduced, but there is no danger of this result if the mercurial action has been produced.

Bubo.—In considering the applicability of mercury and iodine to the treatment of bubo, we must remember that it presents various stages and conditions; those of inflammation, suppuration, ulceration, granulation, and cicatrization, being throughout either active or indolent. It is of much importance to the patient that buboes should be dispersed before they suppurate, or at all events before they ulcerate. M. Ricord has determined that the great majority are not specific in their natures; but whether they are or are not so, is only to be determined by inoculation at a subsequent period, and should form no part in the determination of treatment to avert their consequences. Mr Hunter * tells us that the resolution of these inflammations depends principally upon mercury, and almost absolutely upon the quantity that can be made to pass through them; and the cure of them, if allowed to come to suppuration, depends upon the same circumstances. The quantity of mercury that can be made to pass through a bubo depends principally upon the quantity of external surface for absorption beyond the bubo. Mr Hunter's success, under this method, seems to have been great, as he affirms (373), that since he employed it only three buboes had suppurated, and two of these were in one person, where a small quantity of mereury had a considerable effect on the constitution, and, therefore, a sufficient quantity of mercury could not be sent through the two groins for their resolution; but in both cases the suppurations were small in comparison to what they threatened to be. Dr Wallace's experience tends to somewhat similar conclusions. He says that primary syphilitic bubo may be resolved in ninety-nine cases out of a hundred by mercury in its first stage, if this medicine be used after the plan recommended for primary syphilis, and if its operation be assisted by rest, laxatives, abstinence, and cooling lotions. Therefore, we should, without hesitation, employ mercurial treatment in all such cases, provided there be no contraindicating symptoms. On the contrary, Mr Carmichael thinks that mercurial frictions, when employed in buboes following *venerola indurata* have only increased the inflammation, and their tendency to suppurate, and that they will heal

* Works by Palmer, Vol. ii. p. 368.

better under suppuration if they have not been subjected to strong mercurial irritation previously. Mr Bacot* likewise believes that mercury as frequently promotes the suppuration of buboes as their dispersion.

Education has prejudiced us in favour of Mr Hunter's views; but we must confess that observation has tended to strengthen our belief of the advantages of mercury, provided that it be used with discretion, and combined with general and local antiphlogistic treatment. Mercury should not be employed if acute inflammation exists, and where the patient is plethoric and disposed to acute disease, until by rest, blood-letting, &c., we have brought it into a favourable state for its general and local action.

Nearly the same considerations apply to cases where suppuration has commenced, or extended, being occasionally resolved by mercury, but more frequently progressing. Dr Wallace thinks that the chances of producing absorption of the matter are slender, if the process of suppuration have begun early, and advanced rapidly if attended by much heat or pain, or if occurring in a plethoric or sanguineous habit. But, on the other hand, he remarks, should the process of suppuration have advanced more slowly, have been long in commencing, be attended with comparatively little heat, pain, or inflammation, should the skin covering it be somewhat flaccid or wrinkled, with a strong propensity to desquamate, and should the patient be less plethoric, he does not despair of causing the resolution of the bubo, and the absorption of its contents, particularly if mercury has not been previously used. He says that the mercury should be rapidly introduced, so as to produce its full action, but speedily reduced in quantity, lest troublesome salivation, or mercurial cachexia be excited, but without entirely subtracting the system from its influence.

Mercury has been employed with marked success in France locally for dispersing buboes in their early stages, but in a different manner, and with different intentions. It was originally proposed in the incipient stage of bubo by M. Malapert, but has since been directed with almost equal success against bubo in its second stage, even where the collection of purulent matter has been considerable by M. Reynaud of Toulon. The process consists in the application of a blister, adapted to the size of the bubo, removing the epidermis on the following day, and applying a piece of lint, dipped in a solution of the bichloride of mercury (*Hydrarg. Bichlor.* gr. xx. *Aquæ dist.* ℥i.) to the denuded surface. This is to be kept applied for two hours by a bandage, and when removed it will be found to have produced a brown eschar. This is to be treated on common surgical principles, keeping the patient very quiet till the slough has separated. Some large or indolent bu-

* P. 74.

boes occasionally require a second, or even a third repetition of the process before they are completely dispersed. M. Cullerier states that he has tried this practice for three years under the most varied circumstances, and thinks it a method really efficacious, and which ought to hold a distinguished rank in the treatment of bubo. In the first stage he does not recollect to have seen a single failure. M. Ricord has an equally favourable opinion of this plan, but thinks that it should only be used in buboes succeeding to chancres, and which are probably of a virulent character, since simple bubo (d'emblée) have very little tendency to suppurate, and hence the patient may be safely spared the pain and inconvenience of the process. In these cases he prefers discutient plasters, iodine, or mercury, (*Emp. Hydrarg.* ℥iv. *Iodin.* ʒ. M.) In the treatment of chronic or indolent bubo M. Ricord thinks that frictions with ointments composed of the proto-ioduret of mercury, (*Hyd. proto-iod.* ℈i. *Adep.* ℥i.) or compresses soaked in a dilute tincture of iodine, (*Trœ. Iod.* ℥i. *Aquæ* ℥ii.) are very useful.

In open or ulcerating buboes our indications for treatment are nearly similar to those which apply in chancres. When in a state of active ulceration, irritation, or inflammation, mercury is contraindicated, and the means of relief turn on the correction of these conditions. Mercury proves a valuable auxiliary when these morbid conditions are corrected. As a general rule, says Dr Wallace, mercury is not to be employed after the contents of a bubo have been discharged, until the stage of granulation has commenced, and for the same reason as we refrain from its employment in the ulcerative stage of a primary ulcer. In short, nearly the same treatment is requisite, both locally and constitutionally, through all its stages, according to the plans necessary for the cure of chancre. When a bubo and a primary ulcer occur together, it sometimes unfortunately happens that the indications presented by the former will be at variance with those presented by the latter. Under these circumstances, Dr Wallace says the practitioner should adopt, after mature consideration, that which promises, on the whole, the greatest advantage to his patient.

Buboes of a virulent character have frequently a callous feel, and the ulcerating surface is of a dark foul appearance, or of a light-brown tawny colour, its edges red, angry, and elevated, either indolent or inclined to spread. Mr Carmichael* remarks, that if an ulcer of this description spreads, we may with confidence have recourse to mercury, and we shall, in most instances, find that quick amendment follows its exhibition.

On the continent the internal use of iodine alone or combined with potass or mercury, is considered of great value in the treat-

* Treatises on Venereal Diseases, pp. 309–10.

ment of many forms of chronic ulcerating bubo, but in this country it has not supported the reputation it has there acquired. From what Mr S. Cooper says,* however, it seems to meet with his approbation, since but very little mercury is ever employed in the University Hospital, the medicines more generally resorted to being the iodide of potassium joined with sarsaparilla. Their success, he remarks, has undoubtedly surprised many who have been taught to regard mercury as an essential means of cure.

Constitutional Syphilis.—The symptoms which result from a contamination of the system by the venereal poison are spoken of as *lues venerea*, or constitutional syphilis. Those which occur more immediately upon the primary symptoms are called secondary, whilst those which are more remote are the tertiary. As the most beneficial treatment differs according to the parts affected, there is an evident practical advantage in dividing these symptoms into secondary and tertiary, according to Hunter's division into first and second order of parts. According to Ricord neither of these are capable of transmission by inoculation, the first only by hereditary taint, but not under any specific form. Dr Wallace,† on the contrary, who divides constitutional syphilis into the exanthematic and pustular forms, after much observation, declares that the symptoms are propagated by simple contact, as well as by promiscuous sexual intercourse; that the same may be propagated by artificial inoculation with their secretions; that whatever the mode of propagation may be, the same form of disease, and no other results. The pustular lues differs from the exanthematic in the virulence of the poison absorbed; as its power diminishes in successive attacks it approaches the first or exanthematic form in character.

Secondary syphilis attacks the skin, mucous membranes, eyes, testicles, &c., whilst the tertiary symptoms are tubercles of the skin and cellular tissue, affections of the bones, periosteum, and fibrous tissues, with some internal affections not clearly described. It is in these latter symptoms that the iodide of potassium is so undoubtedly valuable. Mercury and iodine are both of them requisites in the treatment of constitutional syphilis, and I shall now proceed to examine into their respective value and applicability.

M. Ricord thinks the preference should be given to a mercurial treatment, in secondary symptoms, provided that no circumstances contraindicate its use. Desruelles says that mercury, especially the proto-ioduret, is of service in many secondary affections, although he trusts generally to simple treatment. His rule seems to be, that secondary symptoms appearing in an individual who has already been well mercurialised for primary are best treated by simple measures, but that where they succeed the

* Dictionary, p. 1440.

† Lectures, Lancet, Vol. ii, 1835–6, p. 133.

primary not having been treated by mercury, this remedy is nearly always useful, and, exhibited in a mild form, is generally more efficacious than any other remedy. M. Humbert, judging from the results of M. Biett's practice at the Hospital St Louis, remarks, that of all remedies mercury is the most efficacious in curing constitutional syphilis, which exists without acute inflammation, but that it is better abstained from in irritable subjects feebly constituted. He says that it cannot be denied that the preparations of mercury cure confirmed secondary syphilis more frequently than any other remedy. Mr Mayo remarks,* that of the remedies for constitutional syphilis, mercury is so far the most important, that it is the only one, however rarely it may be right to use it with this object, through which the immediate extinction of lues can be anticipated; and that besides, as a repellent of the disease, it is one of the most efficacious. All other remedies, hesays, are exclusively repellent, or capable only of removing the present attack. Of these the iodide of potassium is by far the most efficacious.

Whilst a mild and well-timed use of mercury, employed with discernment and caution, may be regarded as the most judicious treatment, nevertheless, it may prove most injurious in certain states of the disease, and particular conditions of the system, especially the tubercular and ulcerative. Mr S. Cooper† judiciously affirms that mercury will generally expedite the cure of secondary symptoms; but that in some states of the constitution, even when true syphilitic affections are present, or when ulcers, which were originally of this nature, have assumed the phagadenic or sloughing character, and are accompanied by considerable inflammation or much derangement of the health, mercury will prove the worst medicine that can be employed. In pustular syphilitic disease, Dr Wallace‡ thinks the iodide of potassium admirably suited for the removal of the symptoms, and the prevention of the subsequent eruptions, &c. Mercury, when judiciously used, is a remedy well suited, in the majority of cases, to the same purpose; but relapses frequently follow, and there often arises much inconvenience from its administration. There are also many cases in which, from various causes, it cannot be used, and in every case its employment requires more care and judgment than it obtains generally. The employment of the iodide, compared with that of mercury, does not require so much caution, is not objectionable in so large a number of cases, is not followed so frequently by relapses, nor is it so apt to injure the constitution. On the whole, this medicine affords a most valuable remedy for the pustular form of syphilis. Mercury is to be prefer-

* P. 61. † Dict. p. 1447. ‡ Lancet, loc. cit. p. 588.

red when the disease is more purely exanthematic; for example in the rubeoloid, scaly, and fungous varieties, while the iodide is much more suited to the tubercular class, and to these more and more, according as they show a greater disposition to form groups, or to end in ulceration; or, in other words, according as they appear to bear more alliance with the pustular group.

There are but few circumstances which militate against mercury in secondary symptoms, when judiciously timed, and carefully used in favourable cases; neither age, sex, pregnancy, temperament, season, clime, &c. although some may render us more cautious. In relation to the period at which mercury may be employed, Mr Acton (who implicitly follows Ricord,) thinks that the sooner after the occurrence of the disease, the more efficient it is, and the less likely it is to return; for once it has gained a right of possession, the more difficult it will be to expel it from the constitution. Notwithstanding, he says, all that has been written against this mineral, it is the only remedy that can be depended upon in all cases; and so much am I assured of this, that I have seen the very men who declaim most bitterly against it, obliged to have recourse to it after all other remedies have failed. The affection will often get apparently well without mercury, but as the patient is liable to relapses, on slight causes, it is far better to commence immediately. To speak more particularly on the indications for mercury and iodine in secondary syphilis, I must proceed to consider the various symptoms included under this head.

Diseases of the Skin.—All the syphilitic diseases of the skin require antiphlogistic treatment during the stages of excitement and fever, but subsequently yield, in general, most favourably to a mild course of mercury or of the iodide of potassium.

Papulæ.—Syphilitic papulæ are frequently attended by much fever, and are invariably affected prejudicially by mercury during the presence of much inflammation or fever; but when these are reduced by time and treatment, and there is a tendency in the cuticle, covering these eruptions, to desquamate, the greatest advantage results from its use. In many cases weak solutions of the bichloride of mercury may be employed with much advantage to sponge the inflamed surface of the skin. Dr Williams* of St Thomas' Hospital, found the *Lichen Syph. Simp.* subside rapidly in a patient, when this lotion was used night and morning, although it had proved previously intractable, under the internal exhibition of mercury, iodine, and sarsaparilla.

Squamæ.—The syphilitic squamæ are also best treated by mercury generally and locally, provided there be little inflammation and fever, where the system of the patient allows it, and he

* On Morbid Poisons, p. 155.

has not been previously deluged with this mineral. The wash of bichloride of mercury, with or without hydrocyanic acid, agrees well as a local application, and in psoriasis the ointment of the *Ung. Hyd. Nit. Oxyd.* In syphilitic psoriasis, as in the other constitutional symptoms, Mr Mayo is disposed to think it very important to let the complaint wear itself out, when it is possible, with little or no assistance, from medicine. In the most virulent cases a course of mercury may be resorted to with a certainty that it will subdue the attack: this is especially to be recommended if mercury has not been used in the primary disease. He says it only repels, but does not extinguish the affection; that it will appear again, although probably in a mitigated form. The most effective time for its use is, when the disease has lingered on for a considerable time, having, as may be supposed, approached its natural extinction, yet when it is not clearly on the decline, but is stationary or progressive. The extinction of the disease may then be accelerated by the use of mercury.

Exanthemata.—The syphilitic rashes require a treatment similar to that for the papulae; the employment of antiphlogistic means during febrile disturbance to the avoidance of mercury, and subsequently a mild and carefully regulated course of this mineral. Dr Wallace has well observed, that regularity of living and the antiphlogistic regimen will cause tubercles to become either scaly patches or mere stains, and dissipation and improper treatment will cause stains to be raised into ulcerating tubercles. According to Dr Williams,* there are cases which appear to yield only to the iodide of potassium. A gentleman applied to him who had been taking small doses of the bichloride of mercury and sarsaparilla for several weeks, entirely unrelieved by these medicines. A course of the iodide of potassium continued for a short time entirely removed every vestige of the disease, except a few spots, which had previously changed to copper colour.

Vesiculæ.—Syphilitic vesiculæ are rare, and rupia, which is classed as a vesicular disease, according to my observation, scarcely ever commences by a bulla. In rupia the constitutional influence of mercury is frequently injurious, and in debilitated and cachectic patients may prove dangerous or even fatal: somewhat similar rules are necessary, as in phagedenic primary syphilis, but we possess a much safer remedy in the iodide of potassium. This opinion accords with that of most practical men. Dr Williams has seen rupia terminate fatally, even from small doses of mercury, and he adds large are still more unsuccessful. Dr Colles † admits that the scabs and ulcers of rupia appear to be very little under the influence of mercury, even where a healthy ptyalism is induced in vigorous constitutions, only converting the scabs into

* Loc. cit. p. 156. † On the Venereal Disease, p. 179.

ulcers, which, though florid, present an uniform smooth surface, sunk below the level of the skin, and totally devoid of granulations, proving very slow and difficult to heal. But, he remarks, the administration of mercury to patients affected with rupia is worse than useless in all instances where the patient is naturally delicate, or has been much reduced and lowered by the previous disease; for in all such cases it proves almost invariably fatal by increasing the weakness, and generally by inducing an incontrollable diarrhœa. It is only in a few very robust men that it could be said not to have proved highly dangerous or fatal. Mr Mayo states, that in rupia the remedy most to be depended on is the iodide of potassium; mercury, in general, does so much harm in ulcerative syphilis, that one is unwilling to admit it into the list of remedies; nevertheless, when the health is unbroken, and mercury new to the constitution, a brief course is occasionally serviceable, either alone or combined with the iodide. As a local application to the sore, the *Ung. Hyd. Nit. Oxyd.* is, in many cases, a most valuable remedy, and one which, combined with iodine and sarsaparilla, Dr Williams designates as "uniformly successful." He remarks, that so much of it is absorbed, without affecting the constitution, as prevents the formation of fresh vesiculæ. It is quite surprising how manifest an improvement takes place in the condition of some of these patients who have been in an hospital for a short time, taking the iodide of potassium in sarsaparilla, although these are much aided doubtless by rest, a nutritious diet, malt liquors, with or without opium, &c. The main benefit is, however, due to the iodide of potassium, for it produces its sanatory influence even where these juvantia are withheld. It is, indeed, quite remarkable, as Dr Williams says, how rapidly the emaciated and cachectic beings, who are most commonly the subjects of the rupial sore, recover their health and strength under its use, and that without the indulgence of either wine or porter, or of any other than the ordinary diet of the hospital, in which meat is allowed only every other day. Mr S. Cooper has seen various examples of rupia yield to the iodide of potassium in small doses (3 grains) three times a-day, in the University College Hospital; but in some instances other measures were required for a cure.

Pustulæ.—The milder forms of pustular secondary syphilis, when chronic and in a stage freed from any acute inflammation or fever, are amenable to the internal exhibition of mercury. But this is sometimes injurious where ulceration comes on, or where there is much local or constitutional irritability. In the severer forms, and in syphilitic *ecthyma cachecticum*, the iodide of potassium, with sarsaparilla and opium, is the best mode of treatment; indeed, all I have said on rupia is applicable here. If the sores

are free from irritability and inflammation, some stimulating mercurial dressing will expedite their cure.

Fissures, &c.—Almost all the forms of syphilitic fissures and ulcers about the eyelids, toes, anus, fingers, onychia, &c. are best treated by mercury. Mr Lawrence found the free use of mercury to be the quickest and most effectual mode of arresting and curing syphilitic ulceration of the lids; as soon as its influence on the system was produced, the sores lost their syphilitic character, and then quickly healed. Mr Mayo states that ulcers of the eyelids alone are as efficiently treated by mercury as iodine, but the latter is safer for the constitution.

Condylomata.—Condylomatous growths affect the skin in the neighbourhood of the anus, the angles of the mouth, tongue, &c. When inflamed or irritable, they require appropriate treatment; when indolent, the best plan is to wash them with the diluted *Liq. Sodæ Chlorinatæ*, and then dust them with calomel. They in general speedily yield to the internal exhibition of mercury.

Affections of Mouth, Throat, Nostrils, &c.—Some of these affections are superficial, and some most severe and dangerous. The remarks we have already made in reference to the treatment of primary sores, apply also to these secondary ulcerations. All the simple sores, when brought into a favourable condition, are beneficially influenced by mercury. A not uncommon affection is excoriation of an extended surface of the fauces and nostrils, which manifests itself in patches, alternately raw and covered with a moist scale of thickened epithelium. This and superficial ulceration is best treated by gargles of black wash and a gentle use of mercury.

The excavated ulcer is, as Mr Bacot justly observes, readily curable by mercury, which, in general, produces the most obvious effect upon its appearance as soon as the constitution feels its influence; nay, the local action of a mercurial gargle will effect a rapid change in the face of the ulcer.

Cases of phagedenic and sloughing venereal sore throats present many of the varieties and peculiarities already enumerated in primary phagedena. Whilst some are marked by acute inflammation and fever, others occur in broken-down, debilitated, and cachectic habits. In the first, vigorous antiphlogistic means succeed; in the second, the iodide of potassium and sarsaparilla. In vigorous constitutions, when once the ulcer has taken on healthy action, a very mild use of mercury greatly hastens the cure. The majority of phagedenic ulcers of the throat, however, proceed most favourably under the influence of the iodide with sarsaparilla, with or without opium, according whether there be or be not much pain or irritability. The same rules guide us in the application of mercury, as in primary phagedena; where simple phagedena is advancing rapidly, and endangering the life of the patient by its

encroachment on the larynx, we can often check its progress by a rapid introduction of mercury, and then restore the health by the iodide of potassium. In the great majority of syphilitic cases of phagedenic throat, the local application of mercury, by fumigation, is one of the most valuable aids to general medicines. Mr Mayo asserts, that both the excavated and sloughing ulcer are remarkably influenced by mercury locally applied. The most efficient practice is to fumigate with cinnabar or nitric oxyde. Under these agents, the ulcer will often become clean in the course of three or four days. Dr Williams has found the *Ung. Hydrarg. Fort.* applied night and morning, to occasion healthy action speedily, after the failure of ordinary means. The success of the remedy led him to further experiments with mercurial ointments, and he found that the *Ung. Hydrarg. Nit. Oxyd.* might be used in small quantities, with much greater advantage than the blue ointment. Occasionally, as I have remarked, sores of this kind proceed rapidly, in spite of this treatment, and place the patient in considerable danger; and it is under these circumstances that a well-timed, but limited, salivation will give a new and healthy disposition to the ulcer. These cases are injuriously affected by a prolonged or severe use of this mineral, and Dr Colles speaks truly, when he says that all cases of relapse, where the patient has been profusely salivated, and require a fresh use of mercury, are very difficult of cure. Mr S. Cooper is not disposed to allow that salivation is almost certain to arrest the further ravages of the ulceration; on the contrary, he says, "I have seen the disease mostly aggravated by it, and this sometimes in a fatal degree—were these cases of phagedena with black slough?" This gentleman admits that many ill-conditioned venereal ulcerations of the throat are benefited by fumigating the part itself with the red sulphuret of mercury or the gray oxide, by means of a proper apparatus; but thinks, nevertheless, that it is most effectually controlled by touching it with nitrous acid.

Iritis.—It is perfectly unnecessary to canvass the comparative value of mercury and iodine in the treatment of venereal iritis. This disease is allowed by all to present one of the most beautiful, striking, and decided instances of the beneficial influence of mercury,—one under the immediate eye of the observer, and which is cited as an example of the curative operation of this mineral in other diseases attended like it with effusion of lymph. It is necessary to induce a decided action on the gums and salivary glands by this medicine, at the same time that we carry our antiphlogistic treatment to an extent determined by the peculiarities of the case, and act on the iris by the moistened extract of belladonna; nor must we be deterred by the apparent increase of the disease on the first action of the remedy, as I have seen

occur in some few instances, but proceed with its exhibition steadily and determinately, and the inflammation is sure ultimately to yield in the most favourable manner, and that without ptyalism to any severe extent. The mercury should be continued in diminished doses, till the increased vascularity and red zone have disappeared, the natural colour of the iris has returned, the lymph has been absorbed, and vision restored. So universally are practitioners agreed in favour of a decided mercurial treatment, that I never saw any case treated merely by iodine. Dr Williams, however, informs us, that neither the iodide of potassium nor sarsaparilla have the slightest influence in controlling iritis, as it frequently occurs when this medicine is exhibited for the cure of other secondary symptoms, and details an example of the "total inefficacy of the iodide of potassium in iritis."

Orchitis.—Syphilitic orchitis requires a similar mode of treatment. Cullerier highly extols the iodide of potassium, which in his hands proved very successful. When indolent, strapping with mercurial plaster is a successful plan of proceeding.

Tertiary Symptoms.—Almost all authorities recognize the value of iodine in the tertiary symptoms of M. Ricord, Hunter's second order of parts. M. Ricord believes that mercury is as generally inefficacious in these symptoms as the iodide of potassium is successful. Syphilitic diseases of the bones, periosteum, fibrous tissues, and joints most undoubtedly present beautiful specimens of the curative influence of the iodide of potassium, and I have again and again witnessed the marked relief in nocturnal pains, in nodes, &c. &c., as well as the speedy removal of the diseases themselves. According to M. Ricord, nocturnal pains in the bones, periostitis, and disease of bone, are more particularly benefited by the iodide of potassium. He believes that mercury is generally injurious; at least he has abandoned its use, and succeeded better with the iodide. In the treatment of all those diseases of the bones which are the result of ostitis, as caries and necrosis, M. Ricord almost implicitly relies on the internal administration of the iodide; many forms of these diseases have given way quickly to the use of this remedy, which have resisted, or been aggravated by mercurial treatment during an indefinite period of time. Pains in the bones are commonly attributed to the prolonged or excessive use of mercury, but M. Ricord frequently meets with diseased bones and periosteum in various stages, at the venereal hospital, in patients who have not taken a grain of mercury, and who have had chancres as a regular antecedent of the disease. In node much depends on local treatment, besides the internal use of iodine. During active inflammation leeches to the site of disease; in chronic, blisters repeated

according to circumstances. In some forms of hard indolent node, it is occasionally advisable to apply the tincture of iodine, or Malapert's solution of bichloride of mercury, and if these fail, pressure by means of the *Emp. Hyd. c. Ammoniaco*, or the *Emp. de Vigo.*

Dr Williams of St Thomas's was one of the first to introduce the employment of the iodide of potassium in this country for the cure of lues venerea, and he remarks, the discovery of the virtues of the iodide, as the surest remedy in the diseases of the bones, forms an epoch in the history of syphilis. Indeed the action of quina in the cure of ague is hardly more certain, or more striking, than the beneficial effects of the iodide of potassium in the cure of the hard syphilitic node. This gentleman mentions* the following, as the chief advantages of the iodide over mercury in these diseases,—that the relief from pain is seldom complete from mercury till the mouth is fully affected, whilst under the use of the iodide the patient is usually free from pain in three or four days, and almost constantly so in a week;—that mercury often appears to aggravate the disease, and always impairs the constitution, whilst, on the contrary, the iodide never proves injurious, and the rapidity with which many of these patients increase in health and strength is quite remarkable. The iodide also is useful in a much larger number of cases, and effects a cure without that disgusting train of circumstances which accompanies ptyalism; it cures more certainly, in a much shorter time, and with less danger of relapse. There is no evidence to prove that this class of symptoms will heal spontaneously under a simply antiphlogistic diet and treatment; indeed, the longer the delay without appropriate treatment, the more aggravated the disease becomes, and the greater the chances of exfoliation and disfiguration.

Mr J. M. Ferrall† states that the iodide of potassium is generally capable of controlling the morbid action, and relieving the pain in periostitis, in a shorter time than he was prepared to expect. The fifth or sixth dose will, in the majority of instances, enable the patient to sleep; and he has known many instances where the third or fourth dose has produced this effect. He has notes of cases among his out-patients, who slept the first night, having taken four doses during the day. It relieves nearly as soon as incision, and as the iodide treatment avoids a painful though brief operation, he thinks that most persons would prefer, in their own cases, giving it a previous trial. As regards mercury, the preference is clearly on the side of iodine, for in a case treated by mercury, it occupied 37 days; another by incision, 28; a third by the iodide, 13. In the two latter cases purulent matter formed

* Morbid Poisons, p. 165. † Medical Gazette, April 10, 1840.

under the periosteum, and this circumstance, whilst it accounts for healing after incision, being a few days slower than in the first case, gives an additional value to iodine, for it displays its power over the disease even when advanced to suppuration, and its capability of curing it in a shorter period. Constitutional disturbance followed the incision,—ulceration of the cheeks and diarrhœa, the mercurial plan. Among the injurious consequences of iodine, none occurred in Mr Ferrall's practice so early to oblige him to desist; and if, he remarks, gastric derangement should occur, which never did in any instance, it is readily removed.

Syphilitic disease of the bones of the nose, palate, or face are not beneficially influenced by mercury or sarsaparilla. In the incipient stage Dr Williams* has often seen the iodide of potassium fix the already loosened bones, and cured the patient. But, as a general rule, in the advanced stage this medicine has no power over the part affected, although it improves the general health, without the aid of a local dressing. When the bones of the nose are diseased the iodide should be administered in the usual manner, but at the same time the black wash should be injected twice or thrice a day up the nostrils, or what is better, the interior should be anointed with the *Ung. Hydrarg. Nit. Oxyd.* as far as the probe can reach. This treatment has always been successful in Dr Williams' hand, having stopped the disease and saved the nose. In affections of the palate bones the ointment must be applied cautiously, on account of its being readily removed by the tongue.

Diseases of the Joints.—I can confidently state that the iodide of potassium is equally efficacious in the syphilitic diseases of the joints, as in the tertiary symptoms I have already considered. Even where there is acute inflammation, combined with antiphlogistic treatment, I have seen it prove most efficacious.

Tubercula.—We have to treat syphilitic tubercles either in the states of induration, softening, or ulceration, and under any circumstances the cure is long and protracted. In vigorous patients, in the stage of induration, a careful employment of mercury after antiphlogistics answers best as a general rule; but when they have gone on to ulceration, these ulcers are numerous, ill-disposed, and the patient low and cachectic, the iodide of potassium with sarsaparilla proves an infinitely superior remedy. M. Ricord employs the ioduret of mercury with the iodide of potassium to resolve tubercles in their stage of induration. He commences, if there be no contra-indication, with a pill of the proto-ioduret daily, (*Hyd. Proto-iod.* gr. i.; *Ext. Conii*, grs. v.; *vel Pulv. Opii*, gr. ss. M. *ft. pil. o. n. sumend.*) and the iodide in ten grain doses per diem. On the fifth day two pills are given and the iodide increased—being rarely necessary to carry the dose

* Loc. cit. pp. 173–4.

of mercury to any extent, or to continue it long; the treatment is completed by the iodide of potassium. When the local inflammation has been mitigated the tubercles may be washed with a weak solution of the bichloride of mercury; and in the ulcerated condition the nitric oxide ointment, &c. is a good application, and so, according to Dr Williams, is an ointment of the iodide of potassium—one drachm to one ounce of lard. The internal use of the iodide of potassium is the favourite remedy of M. Ricord during the ulceration of tubercles, but where the primary disease has not been largely treated with mercury, that mineral may likewise be employed. Mr Mayo narrates several cases to prove the value of iodine in the ulcerating stage.

M. Ricord mentions the syphilitic deep-seated tubercle as the first disease in which he had tried the iodide extensively with success. The deep-seated tubercle is very liable to inflame and ulcerate, terminating in the formation of foul, spreading, and destructive sores. Mr Babington says that they have their origin in the structures beneath the cutis, probably in the sebaceous glands. Besides the treatment already mentioned, M. Ricord considers local treatment of great importance, which must be directed with the same views as in primary venereal sores. MM. Ricord and Biett both consider mercury alone quite inefficacious, and Mr Mayo alludes to a patient, where mercury was given without any benefit. One fact is to be borne in mind, that "exclusive treatments, to whatever doctrine they belong, are the least likely to succeed," and that complications are never to be neglected; but if acute, it is to be treated before the syphilis, and if chronic, at the same time; so that one remedy be not laid down for this or that symptom, and its exhibition blindly followed, without an appeal to reason, but on empirical principles. Mr Mayo has used the iodide of potassium in many cases, and his conclusions coincide with modern experience, in reference to the cases suited to its administration.

The comparative value of the different preparations of mercury and iodine, and the best modes of administering them.—Mercury is employed locally and generally, either to produce a local effect simply, or, by its admission into the system, to bring the whole constitution under its influence. The mercurial influence is induced in the system by the introduction of mercurial preparations into the stomach, or by fumigation, or by inunction. In the first method we employ the chloride, bichloride, iodide, *pil. hydrarg.*, &c. &c.

Chloride.—Calomel is chiefly useful when we wish to produce a speedy and powerful action on the constitution, as in venereal iritis or orchitis, but is less adapted to the ordinary symptoms. On the Continent it is extensively employed in tubercles of the

labia, with or without ulceration, in various forms of creeping ulcers, and also in ulcerations of the throat and nasal fossæ. Desruelles says, that he cannot too much recommend this preparation, which, united to opium and an antiphlogistic regimen, may produce the most beneficial results. Ricord employs the following pills in the treatment of enlarged testicle, which remains after inflammation of that organ: *Hyd. Chor.* ℈i. *Pulv. Conii Sapon. Hisp. āā* ℈ij. *M. ft. pil.* xxiv.

Bichloride.—M. Dupuytren ordered this remedy in small doses, one-sixth of a grain three times a day, in constitutional syphilis, and on the Continent it still continues to be extensively used for this purpose. In some chronic cases of syphilitic skin disease, I have seen it used with advantage; but as a general remedy in secondary syphilis it requires more care, is more dangerous, and altogether is a less eligible medicine than blue pill.

Pilula Hydrargyri.—This medicine is the form most used and relied on in England, and as it is one of the mildest, safest, most certain, and most manageable preparations of mercury, it justly deserves the preference given it. In doses of five grains two or three times a day, it is applicable to nearly all those conditions which we have shown to be benefited by mercury.*

Proto-ioduret.—MM. Cullerier, Biett, Ricord and others employ this remedy in many forms of constitutional syphilis, especially where secondary and tertiary symptoms are combined, and in primary sores in strumous habits. Cullerier says, that it is chiefly in constitutional syphilis that the proto-ioduret of mercury is administered with success. Its effects are principally evident in secondary ulcerations of the mucous membrane, cutaneous tubercles, exostoses, and chronic affections of the joints, where the other preparations of mercury have had little effect. It should always be guarded by opium, and given in half grain doses twice or thrice a day. The deuto-ioduret is more stimulating, and consequently its dose is smaller. Either of these may be employed in friction upon tumours and indolent buboes, after the removal of all acute inflammatory symptoms.

The cyanuret and deuto-phosphate of mercury are occasionally employed. The former is said to be preferable to the bichloride, being less apt to disagree, and less readily decomposed. It is an useful external application in some skin affections, allaying the violent itching and irritation of what M. Alibert terms *herpes squamosus.*

Inunction.—Inunction by the mercurial ointment was formerly employed, to mercurialize the system more frequently than at the present day. In this way the mineral is less apt to disagree with

* The *hydrargyrum c. cretâ* is generally preferred in the case of infants and children.

the system, especially the alimentary canal, although, when used alone, it is less speedy in its effects. In buboes, I imagine that Hunter was correct in his opinion concerning the advantages of making mercury pass through the affected absorbents. The *Ung. Hydrarg.* is used in the quantity of half a drachm to a drachm night and morning, to be well rubbed in, before a fire, on the more delicate portions of skin. Cullerier prefers using mercury by friction in primary sores; he orders from a quarter of a drachm to a drachm and a half of mercurial ointment at each friction, leaving an interval between them of one, two, or three days, with the view of not irritating either the sore or the constitution, by bringing the latter suddenly under the influence of the remedy. Ricord frequently orders the frictions to the axillæ, and they are employed in this manner by Cullerier, in certain forms of ulcerations of the mouth and fauces. He narrates two cases cured by mercurial frictions in this situation, which had resisted its employment on other parts.

Fumigation.—Fumigation of the whole surface of the body is, at present, rarely used as a method of affecting the system, but the apparatus formerly employed is still to be found in some of our hospitals. It is very speedy in its action.

The remedy is, however, employed locally, and with great advantage, in some affections of the throat and nasal fossæ, directed to the part by a suitable apparatus, and more generally in some obstinate diseases of the skin. For patients who have not strength to rub in mercury, and whose bowels will not bear the use of internal remedies, it has been esteemed highly advantageous.

Topical Applications.—As mere local applications, calomel, black wash, (*Hydrarg. Chlorid.* x. vel xv. grs., *Aqua Calcis* ℥i.,) yellow wash, (*Hyd. Bichlorid.* i. vel ij. grs., *Aq. Cal.* ℥i.,) solutions of the bichloride in distilled water, the nitric oxide ointment, the nitrate ointment, the simple blue ointment, and the *Ung. Hyd. c. Ammoniaco*, are all of them occasionally applied. We select from these in proportion to their stimulating properties, adapting to the condition of the symptoms we treat.

Whatever preparation of mercury be selected for internal employment, it should always be combined with opium or conium, as a certain degree of constitutional irritability almost always accompanies syphilis, which is most favourably influenced by such medicines, and, in some cases where there is sthenic inflammation or fever, antimony. M. Biett's practice has constantly furnished numerous instances where these affections have disappeared under the influence of opium alone without mercury, and MM. Ricord and Cullerier support similar views. Dr Wallace says, that it will be always most prudent to combine the mercury with opium and antimony. No harm can result from this practice; and by it

much inconvenience may perhaps be avoided. The combination of antimony and mercury has always appeared to him to render the influence of the latter more manageable, as well as more certain, while the addition of opium diminishes the irritating influence of mercury on the bowels, and subdues the disposition to an irritable state of the general system, or of the local disease. During its administration we must also carefully watch the health of the patient and the condition of his disease, and omit its further use for the time, should any unfavourable symptoms arise. The diet should be mild, and the state of the stomach and bowels attended to. Dr Wallace recommends the patient to eat a few grains of all-spice or pepper during the day, and to cover the abdomen with two or three folds of flannel. Mr Parker* says, that a nightly pill or draught of some preparation of opium with capsicum may be employed with advantage even during the period the patient is using mercurial frictions; the former not only prevents those attacks of pain, griping, and diarrhœa, which sometimes come on during a mercurial course, and materially retard the healing process, but they contribute directly to the therapeutic effects of the mercury.

The aspect of the sore is to be watched carefully, as it frequently points out when mercury does or does not agree with the system. Dr Wallace says that it will be found a most important rule in practice to omit all mercurial treatment whenever there appears an increase of inflammation or sensibility, to arise in the local disease during the employment of mercury, for a perseverance in its use, under such circumstances, will almost invariably tend to some form of destructive action, determined in its character by the constitution of the patient. In such cases we must have recourse to emollients and anodyne applications, purgatives, rest, abstinence, and diaphoretics, with or without narcotics, and, as soon as the morbid actions which have supervened have been removed, mercury, if necessary, may be again resumed, to be suspended afresh in case of a return either of inflammation or irritability. Should an indolent condition of the sore, and absorption of the granulations, come on during mercurial influence, we must determine the cause and act accordingly.

The quantity of mercury is always to be regulated with the design of deranging the system as little as possible, and patients should be abstracted from all causes of excitement; ptyalism, &c., being considered accidental occurrences. Dr Wallace supports the opinion, that the greater the degree of excitement or of derangement in the functions which mercury produces, the greater is the danger of its action being followed by deleterious effects, or of its ceasing to influence the symptoms of syphilis in a salutary

* Modern Treatment of Syphilitic Disease, pp. 15, 16.

manner. We judge of the requisite quantity from its effects on the disease, and, in general, it is necessary to affect the gums slightly, and to produce a metallic taste in the mouth; but complete salivation is rarely if ever necessary to obtain all the good effects possible in curing chancres, or preventing secondary symptoms. The cicatrization of the sore, without leaving a hardened cicatrix, should be the rule for discontinuing the remedy. When sores remain indolent, under the continued use of mercury, it may be intermitted for some time, and then resumed in some other form. It is a mistaken notion to suppose that continuing the medicine after the sore has healed, and all induration of the cicatrix has disappeared, will protect the patient from secondary symptoms; these will appear after the fullest courses, and yet occasionally they will not appear when not a single grain of mercury has been used. Another point to be borne in mind is, to examine the condition of the mouth previous to the exhibition of mercury, as a state of inflammation or ulceration, with foul breath, might lead us to attribute to the mercury what really depends on other causes.

Iodine.—M. Cullerier thinks that the effects of the iodide of potassium are less prompt than those of mercury, and that, on this account, more should be given, if the stomach will bear it. He employs grain doses of iodine with from two to four of the iodide of potassium in an ounce of water, given at intervals during the day; but he does not increase the iodine beyond two grains in the day, or the iodide beyond ten. I fully believe that the iodide is much more beneficial without the pure iodine, which disorders the stomach without benefiting the complaint. Mr Stone, formerly apothecary to St Thomas's Hospital, told Dr Williams that he was called to prescribe for ten patients taking the compound of iodine and iodide of potassium for one that was taking the last medicine only.

Dr Wallace* found by experience that the iodide of potassium was the only form of the remedy which agreed, that pure iodine was a very powerful irritant, very frequently occasioning severe symptoms, whilst the iodide of potassium was perfectly harmless. Pure iodine, moreover, is converted into hydriodic acid in the stomach. He has seen many cases in which the tincture of iodine, both simple and iodureted, failed to produce any favourable influence, because the irritation excited in the stomach prevented its employment in such doses as were sufficient to act on the disease, and in these very cases the action of the iodide of potassium was subsequently most beneficial. In other cases where pure iodine was employed, although the disease was cured, still it was at the expense of an injured stomach, and great emaciation. On the contrary, he asserts that he has never seen unpleasant effects result from the iodide of potassium, except from mismanagement.

* Lancet, Vol. ii. 1835–6, p. 5.

Ricord employs the iodide of potassium in gradually increasing doses, commencing with ten grains dissolved in three ounces of distilled water, and given at intervals during the day, in any suitable vehicle. According to its effects so must the dose be either increased or diminished;—when the remedy agrees, which it almost always does if the stomach be healthy, the dose should be increased ten grains every two or three days, till it is carried to one or one and a half drachms, or even more, in the course of the day. The iodide of potassium, in full doses, when it agrees, occasions a sensation of warmth in the stomach, improves the appetite, accelerates digestion, so that many grow quite fat, and quickens the pulse. A constant effect is an increased diuresis.

When pure iodine is used, or the iodide given in excessive quantities, or from idiosyncracy of constitution, unpleasant symptoms may arise. Sometimes these are slight and resemble a common catarrh; at others, ringing in the ears and pain in the head, or the skin may suffer from a slight pustular eruption; occasionally it disorders the bowels, or produces pain or uneasiness in the stomach, having some resemblance to pleurodynia, but seated more deeply, and an acrid dryness of the throat. Mr Mayo says that we may sometimes correct these symptoms by adding a few drops of laudanum to each dose, and by administering aperient medicine. Authors assert that some patients experience iodic intoxication, characterized by a slight uncertainty in the voluntary movements, some *subsultus tendinum*, heaviness in the head; a species of intellectual idleness, and sometimes slight delirium. Soreness of the gums and ptyalism are also said to occur occasionally. Mr Mayo has heard of effects resembling mercurial erythismus. Should any of these symptoms occur in a severe degree the dose must be diminished, or even abandoned altogether for a few days, and its exhibition recommenced in smaller doses.

Dr Wallace found the urine to be the best test of the effects of the iodide of potassium on the system, by testing it with starch, &c. In some of his patients he remarked a great increase of perspiration,—sometimes constipation, salivation, roughness of the throat, and heartburn; he found that quinine controlled the state of the throat and stomach. Delicate females, he says, sometimes lose the power of sleeping so much as is natural,—a state of wakefulness often accompanied by peculiar feelings of the head, which is relieved by a purgative and interruption of the medicine. Emaciation, great gastric irritation, wasting of the mammæ and testes, &c. only occur from the use of free iodine. In two patients who had drachm doses of the iodide of potassium administered by mistake, for one day, there occurred in both sickness, soreness of throat, colicky pains, vomiting and purging to a slight degree,

frequent pulse, and exhaustion, quickly disappearing. Several patients, while under the full action of the iodide, were attacked with an acute pain in the anterior and lower parts of the left side, precisely in the centre of the superficies formed by the false ribs, accompanied by some cough, difficulty of breathing, and fever. In all, the affection went off without much trouble. The medicine was omitted and subsequently resumed without inconvenience. In a private patient it produced severe indigestion, a rapid and quivering pulse, headach, and a peculiar condition of the eyes,—the pupils were dilated, and both eyes in a state of incessant motion. He was soon after seized with symptoms of paralysis on one side of his body, preceded by muscular tremblings, which remained for three weeks, but eventually passed off.

Ricord states that the good effects of the iodide of potassium have been constant in his practice, but not produced with equal rapidity, in this respect differing from Mr Mayo, who says that no medicine, where it does good, produces amendment so rapidly; therefore, the propriety of continuing it is never doubtful. As far as I have observed myself, iodide of potassium never gives rise to any serious symptom, provided that it be unmixed with pure iodine, and be administered in moderate doses. Apoplectic and paralytic symptoms sometimes come on during the existence of tertiary symptoms, and these are then attributed to the mercury or the iodide which the patient may be using at the time, but it is hardly fair that the whole blame should fall on the remedy. For an adult it is sufficient to commence with five grains of the iodide of potassium three times a day, and increase it gradually to seven or eight. Dr Williams, whilst he admits that some constitutions are affected even by one or two grains, thinks that the average dose should be eight grains three times a day, for, says he, a smaller dose can hardly be recommended; for the patient's sufferings are so intense as to require immediate relief, and consequently we ought to begin with as large a dose as his stomach will probably bear. This reasoning is not altogether conclusive, for if the dose be sufficient to excite or endanger unpleasant symptoms, we shall have to stop its use altogether for some time, and then finally resort to smaller doses, which, if used at first, would most probably have removed the complaint without any distress or delay. Dr Williams remarks, that when mercury has been previously and unsuccessfully used, the quantity of the iodide necessary for the cure of the patient is often much greater than where none has been exhibited.

Review of the comparative value of Mercury and Iodine in the treatment of Syphilis.—If we take a review of what has now been written, we can readily determine the comparative value of mercury and iodine in the treatment of syphilis;—that mercury and

iodine form the two main remedies on which the best and most unprejudiced treatment of the various symptoms and stages of syphilis mainly hinges, although neither of them should be regarded as a specific, nor can either of them, to be used well and successfully, be exhibited empirically;—that mercury and iodine, when guided by observation, reason, and experience, and combined with such treatment and medicines as the profession would employ were they to lay aside all notions of something specific requiring a blind and specific use of some remedial agent, they stand alone, and infinitely superior to all other medicines which the materia medica can furnish;—that a modified use of mercury is adapted to nearly all the forms, but especially the indurated, of primary syphilis;—that in constitutional syphilis a modified use of mercury is almost a *sine quâ non* in the great majority of secondary symptoms, but is either hurtful or useless in the tertiary;—that iodine is inert in almost all the symptoms of primary syphilis, with the exception of some forms of phagedena, attended with great debility and derangement of the health;—that in constitutional syphilis it is less valuable a remedy in the majority of secondary symptoms than mercury, with the exception of some severe cases of pustular eruption, phagedenic throat, rupia, and secondary ulcerations of bad character, all of them marked by a cachectic and debilitated constitution; whilst in tertiary symptoms iodine is far more valuable than mercury, and its effects more decided and certain than in any other set of symptoms;—that mercury and iodine are most advantageously combined in cases presenting both secondary and tertiary symptoms;—that many forms of mercury, having local or constitutional actions, are applicable to the various symptoms of syphilis, but that the mildest constitutional effect, capable of overcoming the disease, is always to be preferred;—that the only form of iodine safely applicable to the treatment of syphilis is the iodide of potassium, which should never be carried beyond moderate doses;—hence, however valuable the iodide of potassium may be in some forms of syphilis, it cannot be substituted with advantage for mercury in the great majority.

Appendix.

Chancres in the urethra occasionally complicate or simulate gonorrhœa, being most frequently situated at the orifice of that canal, when they may be discovered by merely separating the lips; but occasionally further in, in different situations, to be diagnosed by the induration which surrounds them, and the pain attendant on their course. Dr Wallace probably met with some cases of this kind. The following case occurred under the treatment of M. Cullerier:

Case 1. A man entered the Venereal Hospital said to have suf-

fered from gonorrhœa for twelve months, in the treatment of which copaiba, cubebs, and various astringents had been vainly employed by a variety of surgeons. The discharge, from the patient's account, had never been very profuse; on pressing the urethra firmly there hardly issued some drops of purulent matter. The glans was considerably swollen, and its summit the seat of an induration the size of a nut, surrounding the meatus. On separating the lips of the orifice, a large chancre was discovered, which had burrowed itself deeply into the parietes of the canal. This patient had been submitted to several mercurial courses without benefit, because the local treatment of the sore had been neglected. All internal treatment was now suspended; a strict dietetic regimen and repose were directed to be observed, and leeches were applied from time to time on the ulcer itself. In the intervals a piece of lint, covered with opiate cerate, was kept in the urethra, emollient fomentations were frequently used, and the penis enveloped in a poultice. Under the influence of these remedies the induration soon disappeared, the sore became clean, and a few applications of the nitrate of silver were sufficient to effect a cure.

A frequent situation occupied by phagedenic primary syphilis with white slough is at the orifice of the urethra. Dr Wallace* gives as an example of simple phagedenic primary syphilis, with white slough, the following:

Case 2. Keegan applied at the Infirmary, Jervis Street, in consequence of two buboes, one in each groin—both of great size, and accompanied by great surrounding tumefaction. He had not observed any disease on the penis. When Dr Wallace examined it, with the view of detecting the traces of any sore which could have produced the enlarged glans, he found the orifice of the urethra slightly puffy or tumid, of a semitransparent yellowish appearance, having little sensibility, and accompanied by a very trifling gleety discharge. Being well acquainted with these appearances, as the occasional precursors of the form of sore under consideration, the patient was immediately admitted into the hospital, and the course of a few days verified Dr Wallace's suspicions. The orifice of the urethra, together with the surrounding part of the glans, to the extent of one-fourth of an inch, was converted into a whitish-yellow slough, accompanied by scarcely any inflammation. Mercury was now exhibited, and the sloughing process was thereby not only stopped, but the sore soon became clean and granulating, after which it quickly healed.

Dr Wallace,† in his lectures, published four cases of indurated chancre with black slough, (simple phagedena with black slough.) They all presented great induration, peculiar colour of the sore,

* Primary Syph. pp. 156–7. † Lancet, Vol. i. 1836–7, pp. 698–705.

superficial character of the ulceration, and the remarkable influence of mercury. These sores have a remarkable disposition to assume a peculiar nut-brown, or blackish-brown colour. In fact, they present at different times all shades of brown, from a light cinnamon to a dark nut-brown or chocolate colour. The curious point, however, is, that this colour is not constant. It goes and comes. Thus, the same sore may be one day a dusky white, or of a comparatively healthy red colour, and on the next of a dark brown, approaching black. One of these cases is as follows:

Case 3. P. D. aged 18, a tailor, healthy looking, yet thin. His penis is much swelled, and its extremity bulbous shaped. There is a copious yellow or whey-like discharge from the contracted orifice of the prepuce; and there appears at the left and lower side of the orifice a discoloured patch, the size of a sixpence, so dark at the inner part that it appears black, but at its outer part of a lighter or nut-brown colour. When the base upon which this discoloured patch is seated is grasped between the finger and thumb, it feels as hard as cartilage; but the surface is not above the skin. It is bounded by a sharp thin line. The patient complained of some pain, but there was no swelling in the groin. He stated that a condition of partial phymosis was natural to him. He was ordered to remain in bed, to foment, and inject under the prepuce, and apply a poultice; to take laxatives, and live abstemiously.

2d day. Inflammation less; sore of a more uniform nut-brown.

4th day. Hardness feels stony; swelling diminished, yet phymosis is more complete; diseased surface still of a nut-brown—contracted; circumference thicker, or more raised.

8th day. Surface of sore more healthy or redder; hardness continues undiminished. From 8th to 29th day no new appearances were exhibited except variations in colour, mercury being purposely omitted.

29th day. Ulcerated surface increased, and looks more livid; the raphé on the under surface of the penis, some way back from prepuce, has become both red and tumid; it seems about to ulcerate.

31st day. The surface of the ulcer and raphé is whitish, apparently caused by a flake of pulpy matter; interstices red; hardness as great as ever; swelling of penis increased.

33d. Sore worse; two calomel and tartar-emetic pills three times a-day.

37th. Swelling diminished; hardness less; colour of sore much redder; scarcely any appearance of whiteness, except along the edge; extent of diseased surface decreased.

40th. Mouth sore; swelling and hardness much diminished; under part of the ulcer healed; margin rounded; edge turned in.

46th. Sore entirely cicatrized; cicatrix livid, and is desquamating.

A slight mercurial action was kept up till the 50th day. He was then discharged free from all complaints, with the exception of the phymosis. Dr Wallace remarks, that he allowed the disease to remain uninfluenced by specific treatment for thirty-three days, and during that time it had greatly extended, although the patient was placed under circumstances calculated to prevent deterioration of the state of a common sore. He was then submitted to the salutary influence of mercury, and its effects were almost immediately observable. Thus, on the fourth day after he had commenced, there was an evident improvement, and in thirteen days the cicatrization was completed.

Dr Williams has given the following case, which occurred in his practice at St Thomas's Hospital, as an example of the good effects of the local application of the *Ung. Hyd. Nit. Oxyd.* in some forms of phagedenic sore throat.

A coachman, upwards of six feet high, was brought into St Thomas's Hospital so emaciated, with a voice so sepulchral, a countenance so sunk, and with such general lividity, that at first it was imagined he was labouring under cholera. On examining him, a large and frightful ulcer, which had destroyed all the soft palate and a large portion of the hard, was seen spreading in every direction, as far as the eye could reach, and covered with a dirty ash-coloured slough. His legs were also greatly œdematous. He stated that he had been for two years under every variety of treatment, and was at length wandering in despair he knew not whither. In this state he was seen by the porters on London Bridge, and brought into the hospital. Some few ounces of wine, with the iodide of potassium, were ordered for him, and he was directed to anoint his throat with the *Ung. Hyd. Nit. Oxyd.* night and morning. In a few days the throat put forth healthy granulations; he was shortly afterwards able to walk about the ward; the swelling of his legs disappeared, and in a few weeks he was discharged at his own request. He continued perfectly well.

Dr Wallace* has narrated three cases of severe pustular secondary syphilis, showing the superiority of treatment by the iodide of potassium, (cases of Thomas Hughes and H. P. a smith.) He remarks that the eruption was in all purely pustular; *2d*, The pustules were in all the cases of a very large size; many of them formed ulcers of great magnitude, several of which were covered with the true limpet-shaped crusts, and the ulcers singularly resembled each other in their mode of extension and their mode of healing; *3d*, The throat and mouth were in all severely ulcerated; *4th*, The synovial and fibrous systems suffered much in the first and

* Lancet, loc. cit.

last case, but scarcely at all in the second, the degree of affection being inversely to that of the cutaneous system; *5th*, The exfoliation of the alveolary processes, and of the bones of the nose, occurred in two, in consequence of ulceration of the corresponding mucous surfaces, but, with this exception, the osseous system was not much affected; *6th*, In all, the symptoms of syphilitic hectic were exquisitely marked. So far, he observes, as I have yet seen, the iodide is greatly to be preferred to mercury in this form of syphilis. Mercury will, however, if judiciously employed, effectually cure it in a rapid and secure manner, but not by any means so rapidly nor with so little trouble as the iodide of potassium. He would therefore, under ordinary circumstances, abandon the constitutional use of mercury in this form. The cure of patients may, however, be much accelerated by the topical use of mercurials, black or yellow washes, nitrated mercurial ointment, blue ointment, or mercurial fumigation, alone or alternated. Fumigation with cinnabar is valuable where the mucous surfaces are diseased, and the more necessary, as the iodide is sometimes slow in acting on their ulcerations, (p. 556.) The severe forms of pustular and exanthematic syphilis required, as far as Dr Wallace's experience went, the same mode of treatment. In fact, the same kind of constitution which gives rise to one of these forms will give rise to the other; that is, if the exanthematic virus would produce in any individual its worst type, as bullæ or tubercles, which cause large ulcers and projecting crusts, the pustular virus would produce in the same individual its worst type.

The case of Thomas* was an interesting example of pustular eruption in various stages, with five or six ill-conditioned ulcers; in fact there was not a region of the whole cutaneous surface, with the exception of the palms of the hands and soles of the feet, which was not, more or less, affected by the eruption. The man's constitution was depressed and hectic, and there were two ulcers on the right, and one on the left tonsil, deeply excavated and of a whitish colour, and surrounded by an inflammatory blush. Mercury had previously failed, probably, says Dr Wallace, from an injudicious use, and this was precisely the condition in which he had found the iodide to act in the most beneficial manner; that remedy was, therefore, ordered for him. In four days the remedy had exercised a decidedly beneficial influence on his complaint, although the throat was less benefited than the skin, (its action on the throat is sometimes slower than on the other symptoms of the disease.) On the tenth day his state was remarkably improved in every respect, so much so, that, thinking himself cured, he discontinued to attend. In about a month he reapplied with a relapse, and was again put under the influence of the iodide, con-

* Pp. 428–34.

tinuing it, in all, about six weeks; all his symptoms were speedily relieved, and he had not reapplied.

CASE 6.*—*Pustular Secondary Syphilis, Ecthyma, &c.*—Hughes, ætat. 31, a clerk. The whole posterior surface of his pharynx is involved in one large ulcer, and almost the entire soft palate has been removed by ulceration,—its remains form a large sore,—the inside of his upper lip, and the corresponding part of his gums are deeply ulcerated,—the ulcers being white and pulpy, or sloughy and excavated. He has a copious salivation, several of his front teeth are loose, and some of them have fallen out. These sores afforded a striking example of phagedena extending by a white slough. His entire cutaneous surface, at least his head, trunk, and upper limbs, are strewed with numerous pustules, crusts, ulcers, and cicatrices. Of the pustules, some have a deep base, others are seated more superficially; some have a yellow top, fully developed, others are more papular; some proceed to ulceration, others disappear. There is a remarkable pustule, just forming a crust, on the root of the dorsum of his nose, and another on his forehead. The ulcers are seven or eight in number, seated principally on his back and arms, being of an oval or circular form. They are, for the most part, of a white colour; many are thickly covered by a layer of lardaceous or whitish pulpy matter, through which granulations of a comparatively healthy red are projecting. Each ulcer is surrounded by a narrow red-brown areola; some are healing at one side and spreading at the other; some healing from the circumference to the centre, and others granulating in the centre, but spreading at their circumference. The crusts are of several varieties; irregular and projecting, flat or sunken from pressure, and some true rupial, consisting of a cone of concentric circles, with bran-like portions of cuticle (formed by successive sloughs.) When exposed to cold he suffers slightly from rheumatic pains. He seems to be in a state of great irritability, spends wretched nights, has copious nocturnal perspirations, and is much reduced in flesh and strength.

The present was the third attack of constitutional syphilis under which he had laboured:—the two first were very severe and inveterate under the employment of mercury; in the present he had not used any, consequently the salivation was independent of that mineral. It was a case in which the employment of mercury would have required great caution and judgment, and in which the injudicious administration of this remedy would have done great mischief. Nevertheless Dr Wallace maintains that it was a case which would have been brought to a successful issue, and that in a short time, by the judicious use of mercury, although the iodide of potassium, on the whole, was much better suited

*Lancet, 1836-7, Vol. i. pp. 487-94.

to the case than mercury. The iodide was used in the ordinary manner, and the ulcers covered with adhesive plaster.

8th day. Cutaneous symptoms better; urine loaded with iodide.

12th. His pulse is quicker and fuller—looks much reduced. The disease in his throat seems extending by a white slough, although the ulcers of the cutaneous surface are healing.

18th. Throat and all the other symptoms better. He continued to improve steadily, and, on the 30th day, his appearance was improved and his throat healed, with the loss of his soft palate; his upper lip better, but the alveolæ of the corresponding incisors bare; all the ulcers on the surface were healed, except one on his forehead and one on his left arm.

40th day. He said "he felt as well as ever he did." He continued medicine, with little intermission, for four weeks longer; his health was then completely restored. An exfoliation took place, in the meantime, from the alveolary processes of his upper front teeth.

Dr Williams* narrates the following cases in proof of the good effects of the combined action of the iodide of potassium internally, and the *Ung. Hyd. Nit. Oxyd.* locally, in curing rupia.

Case 7.—George Tovey, a waterman, affected four years ago with primary symptoms, was admited into St Thomas's with many rupial sores on his legs, and, as is sometimes the case, one had formed on the inner membrane of the upper eyelid, while a large and painful node was seated on each tibia. It is impossible to conceive a more emaciated, cachectic, shattered frame than was presented by this individual; he was in a state of confirmed hectic, perspired profusely, and was fast losing the little blood he had left both by the bowels and nose; whilst his mouth was sore, his teeth loose, and his breath foul, from mercury, which he had recently and unsuccessfully taken. Eight grains of the iodide of potassium were given three times a-day, and in a month his pains were gone, the nodes had disappeared, many of the rupial sores had healed, and so rapidly had he recovered his health and strength, that he was now the stoutest and healthiest man in the ward.

But although his health had been so favourably and suddenly changed, there were still many rupial sores, especially that on the eyelid, altogether uninfluenced by the treatment. The *Ung. Hyd. Nit. Oxyd.* was now used as a dressing, by which application every trace of rupia disappeared. This patient had afterwards affections of the throat and nose, but no return of the rupia. This rapid restoration to health in rupia, from the use of the iodide, is so constant, as to render it quite certain that the effect is

* Morbid Poisons, Vol. ii. pp. 159–60.

not accidental, but a consequence of the remedy and a law of the disease.

Case 8.—A stout woman was admitted into St Thomas's with three large rupial sores on her head. She had been treated by small doses of blue pill and sarsaparilla; under these remedies the sore had been so little benefited that one had been lanced, and beneath it the outer table of the cranium could be felt extensively ulcerated. The treatment by iodide of potassium and *Ung. Hyd. Nit. Oxyd.* was adopted. Two of the sores healed immediately, and finally the outer table became fixed, and the patient recovered without exfoliation.

The evidence of the superiority of the iodide of potassium over mercury in diseased bone and other tertiary symptoms, is so decided, that much time need not be expended in the narration of cases to prove it.

M. Chomel, in a case of exostosis of the cranium, attended with severe pain and suffering, with exacerbations at night, evidently depending on a syphilitic origin, administered the iodide of potassium, and in less than a fortnight the pains in the head were gone, the exostosis diminished in size, and in less than a month a perfect and lasting cure was effected.

Case 10.—A lady from the country, to whom her husband had communicated the venereal disease, had been ineffectually treated with mercurials. She had exostoses on the cranium, and elsewhere, and suffered severely. She came to Paris, and placed herself under the care of M. Chomel, who gave her pills, containing the bichloride of mercury, for three or four months. Under this treatment she improved for a while, the nodes diminished in size, and her other symptoms were also better, but the nocturnal pains returned with increasing violence. The iodide was then given, and continued for some time with such success, that at the end of a few months the lady returned home, still using it in diminished doses. The cure was complete and permanent.

Case 11.—Isaac Chilton was admitted into St Thomas's, under the care of Dr Williams, in January 1831, with large and extremely painful hard periosteal nodes on each tibia. His sufferings had been long and severe, and his health greatly impaired. He was salivated by mercury, but his pains returned as soon as his gums had healed. A decoction of *smilax aspera* was then tried, but without success. On the 7th of April a decoction of sarsaparilla was substituted, and continued till the 2d of June, without producing the slightest alleviation of his sufferings. The phalanges of the second and third fingers of one hand inflamed, and necrosis resulting, one finger was obliged to be amputated, and this untoward event took place notwithstanding the application of leeches, and a variety of other local treatment.

The parts having healed, a new treatment was adopted to save the other finger, which threatened a like termination. On the 2d of July five grains of the iodide of potassium, out of camphor mixture, three times a day, were ordered for him, and this quantity was gradually increased to ten grains. In a few days his pains were relieved, and then ceased altogether, the nodes subsided, and the finger was saved. This patient now rapidly recovered from the affections of the long bones, but remained in hospital more than a twelvemonth, suffering from iritis, ulcerated throat, disease of the nose, skin, ligaments, and synovial membranes, but without any return of the periostitis.

Another patient was admitted shortly after with an exactly similar state of the phalanges and tibia. He had been unsuccessfully treated for many weeks by mercury and sarsaparilla, and was so reduced by suffering that his family thought his death inevitable. Eight grains of the iodide were prescribed three times a day out of camphor mixture. The same favourable result happily ensued in this as in the former case, and in two months he was discharged cured, nor has he since suffered the slightest relapse. Dr Williams remarks, that this practice has been subsequently repeated with the same fortunate result in so large a number of similar instances—certainly not less than 200 or 300—that it appears to be clearly and irrefragably demonstrated that this salt is the great specific remedy in the cure of this form of secondary syphilis.

The same author narrates the following case as an example of the total inefficiency of the iodide of potassium in iritis:

Case 12.—John Cushion was admitted on the 15th of November 1834, with syphilitic papular eruption, and an exceedingly painful node on the right tibia, causing œdema of the whole leg; the periosteum of both ulnæ was similarly affected, and there was much pain and tenderness over the whole scalp, and slight inflammation of the conjunctiva. The primary ulcer had healed rapidly under the use of Epsom salts. As the affection of the osseous system was most pressing, the iodide of potassium was given in eight grain doses, and the eyes neglected. The nodes disappeared, but the inflammation of the eyes increased, till the iris became affected, when the pain and intolerance of light was so great that it was necessary to abandon the iodine, and have recourse to mercury. Five grains of calomel were prescribed every night, and in a few days his mouth became affected, the iritis yielded, and he was shortly discharged, cured. (P. 177.)

Art. III.—*On Tracheotomy, in Cases of Chronic Disease of the Larynx.* By Alexander Watson, M.D., F.R.C.S.E., Consulting Surgeon to the Royal Infirmary of Edinburgh. (Read at the Medico-Chirurgical Society, November 1841.)

The following remarks on *tracheotomy* are intended to be confined to the employment of this operation, as a means of relieving certain urgent symptoms which occur in cases of chronic disease of the larynx.

The passage of air to the lungs is interrupted by chronic disease of the larynx, and is more or less impeded according to the diminution which is produced in the laryngeal aperture of the trachea. Inflammation of the mucous membrane and other parts of the larynx, whether simple or specific, occasionally terminates in swelling and thickening of the affected parts, (*œdema glottidis,*) which is often attended with ulceration. In such cases there is loss of voice, difficult, and sometimes painful deglutition, accompanied with more or less interruption to respiration. The subjects of this disease whom I have seen have been adults about the meridian of life; most of them seemed to suffer from no other disease; though some of them were affected with catarrh, while others presented symptoms of syphilitic disease.

This chronic disease of the larynx may continue and gradually increase for a great length of time, making slow, yet manifest progress without much inconvenience to the patient; and, ultimately, not only occasioning great uneasiness, but causing such interruption to the functions of deglutition and respiration, as to impair very greatly the general health and strength of the individual. In the further progress of the disease a very important circumstance takes place in many of the cases,—the respiration becoming more and more impeded, till at length complete suffocation is either threatened, or puts a period to the life of the patient.

This impeded respiration, in the cases alluded to, presents several peculiar characters. The difficulty of breathing is not uniform. It generally occurs in fits or paroxysms during the night, more especially upon any cause aggravating the local disease; and it is attended with a peculiar crowing sound, from the inspirations being more affected than the expirations. Indeed, while the expirations are performed with comparative ease, the inspirations are so much interrupted, that the patient has a look of great anxiety and distress—seems gasping for breath,—and puts the whole respiratory muscles into violent action, as shown by the heaving of the chest. In a short time the lips and surface of the body acquire a livid hue, and the patient is in imminent danger of being

suffocated. This difficulty of breathing has been considered to be a spasmodic state induced by the affection of the larynx. It is in this state of matters that the prompt assistance of the surgeon may save the life of the individual by the operation of tracheotomy; and, at the same time, place the patient in a state of comparative ease and safety, as well as render his condition more favourable for the ultimate cure of his disease.

The following cases not only illustrate the preceding remarks, but present some interesting features in regard to cases requiring this operation.

Case I.—Alice Stotten, aged 28. Admitted into the Royal Infirmary 21st August 1838. For the last six months has laboured under an affection of the throat, attended with pain, difficulty of swallowing, hoarseness, and fits of dyspnœa. This complaint is accompanied with considerable purulent sputa. These symptoms have increased much during the last two months. On looking into the throat the fauces are red and swollen; and there is some ulceration of the posterior parts, covered with viscid puriform mucus. Auscultation indicates general chronic bronchitis. Action of heart natural. The fits of dyspnœa come on without any evident cause. Pulse, 76, and soft; appearance emaciated; skin cool; appetite good.

By means of care and the use of ordinary remedies, consisting of blisters, gargles, inhalation of steam, purgatives and proper diet, this woman became considerably better, during the first two or three weeks she remained in the hospital. Her complaints then became suddenly aggravated, and the fits of dyspnœa in the evening threatened suffocation. During these paroxysms the difficulty of inspiration was very great, and it was attended with a loud crowing sound. The countenance became livid, and expressed great anxiety; there was great heaving of chest; and the patient could scarcely speak in a whisper so as to be audible.

The state of this patient now became extremely urgent,—probably not from the state of the larynx alone, but obviously this rendered her apparent danger more immediate from suffocation. With the concurrence of some of my colleagues, therefore, on the 12th of September I made an opening into the trachea, and inserted a silver tube into the aperture for respiration. This was followed with immediate relief to the urgent symptoms, and refreshing sleep, to which the patient had been for some length of time a stranger.

In consequence of the catarrhal affection, the expectoration continued to be very copious for some days. But this gradually diminished, and she continued to recover. After a few weeks she became so well that she left the hospital, but could not dispense with the tube in her windpipe. The disease in the larynx be-

came so much better, that by putting her finger on the orifice of the tube in the windpipe, she spoke with a much improved voice. I have not seen this patient since she left the hospital.

Case II.—Jean Alexander, aged 46, a widow. Admitted into the Royal Infirmary 10th April 1839. Has been affected with difficulty of breathing for the last twelve months, frequently occurring in fits nearly to suffocation. During the intervals, the inspirations are performed with greater difficulty than the expirations. The inspirations are attended with a crowing sound, which becomes much louder during the more urgent paroxysms. Her voice is so much affected that there is almost complete aphonia. Patient looks thin and emaciated. The epiglottis feels natural; no ulceration of throat.

On the 13th the breathing was reported to have become extremely urgent during the night, with much crowing noise, frequent short cough, and expectoration; but there did not seem to be much affection of the lungs.

I this day considered it proper to make an opening into the trachea and insert a tube, in order to relieve the breathing, and allow rest to the parts about the larynx.

After the operation the patient passed a very quiet good night. She continued to recover, never had another fit of urgent breathing, became stronger, and the disease of the larynx seemed much better when she left the hospital on the 10th of May.

On the 18th of March 1840 she returned to the hospital to have advice as to taking out the tube from her throat, which she had continued to wear without inconvenience.

I have lately heard of this woman being quite well, (November 1841,) but she still continues to wear the tube in her windpipe; chiefly, however, as a safety valve, in case of being again attacked with difficulty of breathing.

By the kind permission of my late colleague, Professor Fergusson, now of London, I am enabled to lay before the Society the two following cases, which were under his care in the Royal Infirmary previous to his leaving Edinburgh, and which I had frequent opportunities of seeing.

Case III.—Peter Dalgleish, aged 25, a labourer. December 19, 1838. Complains of difficulty of breathing and of swallowing solids. Inspiration is accompanied with a strong sonorous sound, chiefly heard at the situation of the thyroid cartilage. This sound increases much during sleep. No sores on throat; upper part of larynx feels natural; no affection of lungs, and no expectoration. Three months ago, in consequence of falling asleep on the cold ground, after a day of hard labour, he got a severe cold and sore throat. Has since remained hoarse, and, during late cold and damp weather, his respiration has become difficult.

By the application of blisters, calomel with opium, and other suitable remedies, he was, in ten days after his admission, dismissed much relieved.

On the 4th of January 1839 he was again admitted into the hospital, his former complaints having become much aggravated by exposure to cold while at his work. The fauces are red and swollen, by which deglutition and respiration are impeded; there is some cough and considerable fever present. The inspirations are accomplished with much greater difficulty than the expirations, and attended with considerable sonorous râle. Bleeding, blistering, and antimonials were administered, and on the 6th the following report was made of his case:

"Considerable relief from leeching, &c., but at night the symptoms became again aggravated; the respiration became very difficult, accompanied with great restlessness. At two A. M. the difficulty of breathing became so great, that, before assistance could be rendered, (though speedily sought for,) he became perfectly asphyxiated. All sensibility had fled, the respiration had ceased, and the pulse became fluttering, irregular, and slow. The operation of tracheotomy was immediately performed by Dr Williamson, (clerk to Mr Fergusson,) between the sternum and thyroid gland, and four rings of the trachea divided,—a tube was inserted, and (no sign of respiration returning) breath was thrown into it, and the chest was compressed. The pulse became more distinct, and inspiration followed, succeeded by an expiration; and while respiration became established, tremors of the face and slight convulsions of the body took place, accompanied with sudden dilatation of the pupils. These soon subsided, and the patient became sensible, as evinced by his thrusting out his tongue when desired. He ejected a little frothy blood mixed with mucus through the tube, and expressed himself gratified with the change which had been effected."

His breathing became easy after the operation, and sleep was procured, and he continued to recover from the present attack; but, in the month of March following, he died from bronchitis, and no dissection was allowed.

Case IV.—Elizabeth Maclachlan, aged 40. 26th December 1838. Of stout appearance; is at present affected with difficulty of respiration. The inspirations can scarcely be performed, and are accompanied with a crowing sound, but the expirations are comparatively easy. The uvula and soft palate are wanting. The epiglottis can be felt with the finger. Considerable redness of fauces. Some cicatrices and sores about the head and nose.

Became affected with syphilis six years ago, from which she recovered with the loss of the soft palate, cartilages of the nose, and a portion of the right cheek. Got mercury to salivation.

Had no difficulty of breathing till six weeks ago, when, from exposure to wet and cold, she had an attack of inflammation of the upper part of the windpipe. The difficulty of respiration becomes worse at night.

The urgent and dangerous nature of her case was explained to her, and the operation of tracheotomy proposed to relieve her breathing, to which she would not consent. But at one o'clock in the morning of the 28th, the respiration having become more urgent, she consented to the operation, which was performed by Mr Fergusson. This was followed with immediate relief to the respiration, and after a few weeks she left the hospital cured.

In each of these cases the opening into the trachea was made below the thyroid gland.

The immediate relief to the urgent symptoms, in chronic disease of the larynx, and the beneficial effect upon the diseased parts, produced by the operation of tracheotomy, are strikingly exhibited in the preceding cases. The operation is attended with so little danger, and is so easily performed, that in cases where the patient is threatened with suffocation from difficulty of breathing, caused by disease of the larynx, it should be performed at an early period, rather than peril the life of the patient by delaying to resort to it until he is reduced to the last extremity, and when assistance may not be obtained. This is also advisable, because it is better to operate between the paroxysms of dyspnœa than during a fit.

The following cases show the dangerous state of the patient affected with chronic disease of the larynx. This state of extreme danger might have been completely obviated by tracheotomy; and the repose obtained to the diseased parts of the larynx, by the establishment of respiration by the artificial aperture in the trachea, would have placed the patients in a much more advantageous position than previously for the cure of the original disease.

Case 5.—In 1829, a memorable year in the history of anatomy, when great excitement prevailed in the public mind concerning "body snatching" for anatomical dissection, a sudden death happening in the house of a notorious "resurrectionist," was, as might be expected, the cause of a suspicion of murder. Accordingly, in consequence of the clamour which arose in the neighbourhood, of this individual having murdered his wife, in order to sell her body to the anatomists, I was requested by the authorities to inspect her body, and report as to the cause of her death. I found that this woman, who was about thirty years of age, had, for a considerable time, been affected with chronic disease of the larynx, from which she died very suddenly. Before her death she was able to go about, though she had, in a great measure, lost her voice, and had occasional difficulty of breathing. On dissection

I found extensive ulceration of the larnyx, and thickening of the parts, by which the air passage was much contracted.

Case 6.—In consequence of the very sudden death of Mary Hall, an out-pensioner of the House of Industry, I was requested by the sheriff to inspect her body, and report as to the cause of her death. This woman was about forty years of age, and seemed to have been in pretty good health, with the exception of chronic disease of her larynx, which, however, did not prevent her from going about. With this she had been affected for nearly two years, and was subject to dyspnœa and difficulty of swallowing. On the 6th of April 1836 I inspected her body, and found her death to have been occasioned by extensive ulceration of the tonsils, larynx, and top of the pharynx.

Case 7.—In 1838 I admitted a woman into the Royal Infirmary, affected with chronic disease of the larynx. From the loss of voice, and the account she gave of the difficulty of breathing which occurred at night, I showed her to several of my colleagues, who happened to be there at the time, and proposed to perform tracheotomy, conceiving it to be a case requiring it. To this they did not give their assent, as they did not consider the symptoms so urgent as to require it. The operation was delayed, difficulty of breathing returned in the evening, and she died suddenly that night before assistance was procured. Not having been twenty-four hours in the hospital, no particular account of her case was kept. No dissection was obtained.

I shall only take leave to trespass further on the time of the Society by the mention of another case, which shows how little danger there is to be apprehended from tracheotomy.

Case 8.—In April 1839 I admitted a woman about 45 years of age into the Royal Infirmary, on whom the operation of tracheotomy had been performed four times by Mr Liston, and three times by Mr Lizars. She came from the country to have the aperture in her windpipe closed, after having breathed through it (at least partially) for more than three years.

In this case the larynx seemed to be free from disease. But being subject to attacks of inflammation, the patient preferred retaining the tube in her throat to the risk of requiring another operation, or of being suffocated from want of assistance in the country. The impervious state of the silver tube from an accumulation of hardened mucus, and the state of her breathing when the finger was placed upon the aperture in the trachea, together with her having been several years free from the inflammation of the larynx, sufficiently showed that the aperture might, with propriety, be closed. To effect this I was obliged to cut off a small portion like a ring of the callous margin from the whole circumference of the opening, and then retain its sides in opposition by a harelip pin and ligature. In

about two weeks she left the hospital quite well. In this case the skin adhered firmly to the trachea at the opening. It would have been improper to pin or stitch the sides of the trachea; and had I separated the adherent skin from the trachea, and then united its edges, emphysema of the skin would have been the consequence, as the aperture in the trachea would have remained pervious, when that of the skin was closed. But by taking advantage of the adhesion of the skin to the trachea, and carefully avoiding their separation, the parts were easily retained in contact, and united in the manner most desirable.

ART. IV.—*Case of Compound Fracture of the Lower Jaw, by a fall from the top of a Cart of Hay.* By ALEXANDER WATSON, M. D., F. R. C. S. E.

JOHN TRAINER, a labourer, aged 27, was admitted into the Royal Infirmary February 26, 1839, in consequence of a compound double fracture of the lower jaw. By these fractures, the central portion of the jaw, which contained the two incisor teeth of the left side, and one of the right side, was detached and quite loose, but was adhering to the soft parts, which had also been a good deal lacerated. The different portions of the jaw were retained as steadily in their proper position as possible, by means of a pasteboard splint and bandage.

Considerable swelling and inflammation of the soft parts around the fractures took place. This having been followed by suppuration, there was a copious flow of matter from the parts connected with the fractured portions of the jaw. On the 4th of March, although this discharge of matter was copious, an abscess began to form at the under part of the chin. In consequence of this abscess, the bandage had to be discontinued and an emollient poultice applied.

After the abscess was opened the case continued to go on favourably. But from the impossibility of keeping the broken parts steady or in apposition by a bandage, I tied the loose fractured part to the lateral portions of the jaw by means of silk thread. This, however, I found worked off, by the motion to which the parts were constantly subjected. On the 4th of April the fractured parts were still very moveable, and several small exfoliations of bone had been discharged. The discharge of matter was now greatly diminished. I this day succeeded in fastening the loose portion of the jaw more effectually to the sides by silver wires, placed around the teeth, by which they were well retained *in situ* for the necessary time without inconvenience. On the 9th of May the suppurations were healed, and the broken parts of the

jaw were firmly consolidated, so that the patient eventually obtained a complete cure. The wires had become loose and were now taken from the teeth. During the progress of the case seven portions of bone were discharged from the suppurating parts.

This case is narrated chiefly with a view to recommend the application of wires upon the teeth to retain fractured portions of the jaw steady and in their proper places; these means having been found very effectual in this case, which, from its aggravated nature, was attended with considerable difficulty, being a compound comminuted double fracture of the jaw, with extensive suppurations, which prevented the application of a proper bandage, and required about three months' treatment before the cure was effected.

2. *Case of Extensive Fractures of the Alveolar Processes of the Lower Jaw.*

Janet Macfarlan, a servant, aged 26, was admitted into the Royal Infirmary on the 7th of April 1840, affected with considerable swelling and inflammation of the soft parts around the right side of the lower jaw, both at the cheek and gums. The whole of the teeth at the anterior part and right side of the jaw were very loose.

Six weeks previously to her admission to the Infirmary an attempt had been made by a surgeon to extract the first molar tooth on the right side of the lower jaw; but it is said to have been broken across and the root left. Much swelling followed this operation, and, in three weeks after, the root of the tooth and two pieces of bone were discharged.

On her admission to the Infirmary, leeches, fomentations, and poultices were applied, along with general medical treatment. Several abscesses formed around the side and fore part of the jaw. On the 15th several of these had opened, both externally upon the cheek, and internally through the gums. By means of a probe introduced by these openings, the jaw was felt to be soft, and in some parts dead, so that the probe could be easily passed into the bone. The whole parts around the jaw were very tender to the touch, and the discharge of matter was very considerable.

The swelling, discharge of matter, and other symptoms, gradually abated, and on the 18th several small portions of dead bone were discharged.

This patient soon became so much better that she left the Infirmary; but called on me frequently afterwards for my advice. Although the teeth on the right side and in front of the lower jaw were loose, I felt unwilling to remove any of them so long as

there was the least prospect of their again becoming fixed. I conceived that the alveolar processes had been extensively fractured, but, from former experience, I thought they might, (at least in part,) again become united.

Some weeks after she left the hospital there was still considerable discharge of matter from several openings, and more particularly from one at the gum on the middle of the right side of the jaw. Having mentioned the case to Mr Nasmyth, who expressed a wish to see her, he was kind enough to examine it along with me. We found that most of the teeth of the lower jaw were much in the same loose state, and Mr Nasmyth recommended the extraction of three or four of them, where there was a dead loose portion of the alveolar processes, anterior to the situation of the first molar tooth which had been originally extracted. These teeth and the dead portion of their sockets were extracted, and the state of the parts became much improved. Other small portions of bone came away through the openings at the cheek and gums. After some months the discharge of matter ceased, the abscesses closed and healed, and the remaining teeth, with their alveolar processes, became firmly fixed to the jaw.

In this case extensive fracture and detachment of the alveolar processes of the lower jaw had taken place, from the force employed in extracting a tooth. These were followed by great inflammation, suppuration, and exfoliation. As the event shows, it was fortunate that, though quite loose, more of the teeth had not been extracted; for they again became quite fixed, probably by the reunion of their alveolar processes to the base of the jaw.

Some years ago I had under my care a man who had a fracture of the alveolar processes of several of the posterior molar teeth caused by the operation of extraction. When I first saw him suppuration had taken place, and feeling a dead portion of the jaw loose, I extracted it with forceps, after which he completely recovered. I afterwards gave the portion of bone, which was about an inch in diameter, to the late Mr Hardy.

ART. V.—*Report of Cases treated in the Royal Naval Hospital, Malta.* By Dr WILLIAM MARTIN, Deputy-Inspector. Reported by T. SPENCER WELLS, M. R. C. S., Additional Assistant-Surgeon.

DURING the year 1842, 813 patients have been under treatment in Malta Hospital. Of these, 95 were remaining on the 1st of January, and 718 were received during the year. Of the 813, 542 have been discharged cured, 161 invalided, and 51 died,—leaving 59 in hospital on the 31st of December. The largest number in the hospital on any one day was 139, and the average number daily treated $99\frac{205}{365}$.

The following table shows the diseases of the 51 who died:—

Phthisis,	17	Brought up,	43
Fever,	6	Pericarditis,	1
Diseased kidney,	3	Fracture of sacrum,	1
Gangrene of lung,	3	Abscess of liver,	1
Dysentery,	4	Marsh fever,	1
Typhoid pneumonia,	2	Effects of intermittent fever,	1
Pleuritis,	2	Variola,	1
Erysipelas,	2	Spinal apoplexy,	1
Cerebral effusion,	2	Caries of cranium, and abscess of brain,	1
Injury of head,	2		
	43		51

Of the 161 men who were invalided, 129 were seamen, including 9 officers, and 32 were marines.

Of the 129 seamen, 13 were invalided for phthisis; 18 for other pulmonic diseases; 13 diseases of heart; 9 renal diseases; 6 chronic diarrhœa; 5 lameness after fractures; 6 spinal disease or injury; 3 severe injuries of the hand; 13 general debility, old age, or emaciation; 4 dysentery; 2 injuries of the elbow; 2 effects of fractured skull; 2 fistula; 3 rheumatism; 4 ulcers; 2 cephalalgia; 2 stricture of urethra; 2 amaurosis; 2 diseases of testis; 4 chronic gastric affections; 1 intermittent fever; 1 necrosis of humerus; 1 caries of *os frontis;* 1 cirsocele; 1 monomania; 1 diseased hip; 1 ophthalmia; 1 scrofula; 1 vertigo and impaired vision; 1 caries of *ossa nasi;* 1 convulsive disease resembling epilepsy; 1 syphilis; and 1 whose thigh had been amputated. The difference of one arises because one man invalided afterwards died.

Of the 32 marines, 5 were invalided for phthisis; 2 chronic bronchitis; 3 cardiac disease; 3 syphilis; 3 epilepsy; 3 general debility; 2 renal disease; 2 varicose veins; 1 dysentery; 1 paralysis; 1 caries of tibia; 1 disease of antrum; 1 scrofula; 1 hepatitis; 1 injured foot; 1 fistula; and 1 cephalalgia.

Table A.

1842.	Diseases of the Nervous system.	Respiratory organs.	Organs of circulation.	Digestive organs.	Genito-urinary organs.	Organs of locomotion.	Tegumentary and fibrous tissues.	Injuries of all kinds.	Specific diseases.	Total.	Thermometer at noon. Max.	Thermometer at noon. Min.	Barometer at noon. Max.	Barometer at noon. Min.	No. of rainy days.	Prevailing winds.
January,	3	6	1	11	2	7	8	13	24	75	57	51	30.13	29.40	15	W.S.W., W.N.W., N.N.E.
February,	4	9	0	5	3	5	20	18	11	75	59	53	30.30	29.46	14	W.S.W., W.N.W., E.
March,	8	11	2	4	2	4	8	8	11	58	62½	57	30·07	29.46	5	S.W., N.W., N.E.
April,	8	11	2	6	7	1	11	11	17	74	66	61	29.91	29.44	4	W.N.W., E.N.E.
May, .	3	15	3	4	1	0	16	13	8	63	70	65	29.96	29.60	1	S.S.E., W.
June, .	3	14	3	3	3	1	5	8	19	59	78½	71	30.04	29.90	4	N.W., N.N.W.
July, .	3	9	3	13	5	3	19	17	19	91	83½	77	29.99	29.85	0	E., N.N.E.
August,	0	10	3	11	5	1	5	4	11	50	81½	77½	30.07	29.83	5	S.E., S.S.E., a few days N.N.W.
September,	6	4	2	5	0	1	10	5	5	38	84	75	30.00	29.63	0	S.S.W., E., a few days W. and N.W.
October,	1	13	2	12	2	2	18	8	12	70	79	69	30.09	29.70	5	S.E., W.N.W.
November,	4	3	1	9	4	2	4	4	2	33	72	60	30.12	29.54	8	W.N.W., S.S.W.
December,	4	3	0	4	4	4	3	4	7	33	64½	55	30.16	29.65	8	S.E., a few days W. and S.W.
Total,	47	108	22	87	38	31	127	113	146	719					69	

The above table, marked A, shows the number of patients admitted during each month of the year suffering under diseases of the cerebral or nervous system; diseases of the organs of respiration; of circulation; of the digestive organs; of the genito-urinary organs; of the organs of locomotion; of the tegumentary and fibrous systems; and of specific diseases, with those of uncertain seat, and injuries of various descriptions. In the other columns are given the maximum and minimum of the barometer and thermometer for each month, the prevailing winds, and the number of rainy days. The mean force employed during each month would also have been given, but that it might lead to incorrect inferences as to the ratio of severe cases in the fleet.

The above table is only useful in showing the relative proportion of the diseases of different organs *in hospital* during certain periods, and the state of the weather at the time; for the practice of various surgeons with regard to sending men to hospital is so different, that, from a ship of 800 men, we may not receive four in a month, and from another of 300 double that number. The state of the barometer and thermometer was taken daily at 12 o'clock, and the instruments kept in a situation the least exposed to merely local influences or changes.

I shall now proceed to speak of the various cases of interest that have occurred during the year, under the following heads:—

Diseases and injuries of the apparatus of sensation and volition; of the respiratory apparatus and injuries of the thorax; of the circulatory apparatus and injuries of the blood-vessels; of the digestive organs and injuries of the abdomen; of the genito-urinary organs and injuries of the perineum; diseases and injuries of the organs of locomotion; of the tegumentary organs and fibrous system; specific diseases, and diseases of uncertain seat.

Diseases of the brain and nervous system have not been numerous during the year; but most of those which have occurred have been of interest. I shall first notice one of

Abscess of the brain, with caries of the temporal bone, in which trephining was employed.—Thomas Jenkins, aged 23, ordinary seaman of H.M.S. Thunderer, admitted 25th February 1842. His messmates state that he was always a quiet, silent, temperate man, and that he had not been on the list before the 11th ultimo. He then complained of pain in the right jaw, with swelling of the right side of the face, which continued gradually and steadily to increase, with considerable pain; but nothing more was observed at the time of his admission than is common in mere cases of superficial abscess. The countenance was turgid on the right side, and there was a great deal of tension from the outer canthus to the *meatus auditorius externus*. He said the pain of the face prevented him from sleeping, and he appeared a little deaf, but no other cerebral symptom ap-

peared. The pulse was 80 and regular; no marks of disease in the chest or abdomen; the tongue was slightly coated, but he had been freely purged. He was put on low diet; fomentations and poultices were applied to the face; and he took ten grains of calomel.

26. No change, except that there has been slight purulent discharge from the *meatus auditorius*.

27. The abscess was opened and a considerable quantity of purulent matter discharged freely. No change was observed during the 28th, except that he always lay on his left side.

March 1. Seemed rather stupid, but there were no symptoms of constitutional disturbance. The abscess discharged freely.

To have ten grains of calomel.

On the 2d and 3d he still lay continually on the left side; and on the 4th he appeared to sleep more than natural. There was also a flush over the face.

5. Slept the greater part of the day, but, when roused, appeared perfectly sensible and rational. Pulse perfectly natural.

Ten grains of calomel were ordered, followed by four ounces of compound infusion of senna.

6. Stupor much increased, but still sensible when roused.

7. Semicomatose; diffused puffy swellings appeared over the right side of the frontal and right parietal bone. The head was shaved, and on probing the abscess to the bottom, carious bone was distinctly felt. Since 10 A. M. the breathing has been stertorous, but the pulse never below 70. At 1 P. M. the right pupil was dilated widely, the left contracted, and both were unaffected by a strong light; but this state of the pupils only continued for about half an hour; they then became regular and contractile, but sluggish. The stertor and coma increasing, at 9 P. M. the puffy tumour over the parietal protuberance was divided, and a portion of bone removed by the trephine, without injury to the *dura mater*. This membrane appearing very tense, was divided by a lancet, and about two ounces of blood escaped from a small artery. The probe passed easily between the *dura mater* and the bone, and the temporal bone was felt to be distinctly carious internally. No relief followed the operation.

March 8. Continued insensible all day. Pulse 70, rather full and strong; skin excessively hot, and bathed in a most profuse acid perspiration; pupils sluggish, but regular and contractile.

9. Breathing became very hurried and laborious, and the acid perspirations continued to be excessively profuse. No alteration in pupils. These symptoms continued until 1 P. M. when he died.

The body was examined 20 hours after death.

It was found that the pericranium was very loosely attached to the bone over the right side of the head, the bone being darker in colour than usual. The *dura mater* was very loosely attached on this side, but not separated by any effusion. The squamous portion of the temporal bone and the temporal process of sphenoid bone were carious and perforated in several points. In the superior and lateral portion of the right hemisphere of the cerebrum, and corresponding with,

or a little anterior to, the parietal protuberance, immediately beneath the spot where the trephine was applied, there was a large abscess. Its superior wall was formed by a very thin layer of cerebral matter; it was filled with creamy purulent matter, and distinctly encysted by a form of sac rarely found in the brain. It resembled that of the chronic abscess of cellular tissue, being formed of a layer of vascular villous substance, having many of the microscopic characters of mucous membrane. This sac was sufficiently large to have contained a full-sized duck's egg, and the surrounding tissue was but slightly softened. There was a considerable quantity of fluid in the ventricles, and the brain was otherwise healthy.

There were old adhesions of the right pleura, and more fluid than usual in the pericardium. Slight injection of small intestines. All the other thoracic and abdominal viscera were perfectly healthy.

Remarks.—This is one of the very few cases on record in which the trephine has been applied for the purpose of removing purulent matter from within the cavity of the cranium. The indications for the performance of the operation were clear. The man had facial abscess; this evidently depended on caries of the temporal and sphenoid bones; cerebral symptoms supervened, and it was a natural supposition, that the same cause exciting suppuration without, might do the same within. The parietal bone was chosen as the site of perforation, to avoid the important vessels and nerves in the vicinity of the diseased bone, and also on account of the puffy swelling over it. It was proposed to carry on the operation by passing a lancet into the substance of the brain; but there did not appear to be sufficient reason to call for such a step, as the brain did not feel particularly tense at the site of perforation.

I have sent the preparations, both the bone and cerebrum, to the Museum of Haslar Hospital.

I shall now briefly advert to a case in which there was hypertrophy of the right hemisphere of the cerebrum, with serous effusion in the cerebellum and in the cerebral ventricles.

J. Wenmouth, ordinary seaman, aged 24, of a spare habit, complained, for the first time, on the 4th of March, of headach and giddiness, with symptoms of dyspepsia. Aperients and blisters were used, and he returned to his duty on the 25th; but complained again on the 27th, of increased giddiness and general debility. He was admitted here on the 29th, when he was put on low diet and took a purgative. The man appeared pretty well until April 1, when he complained of most excruciating pain in the head, confined to the occiput. The head was shaved, and two grains of calomel with antimony given morning and evening.

2. Pain continues, but no constitutional derangement, or any other cerebral symptom.

3. Pain comes on in fits of excessive agony, and he is at times insensible, with slightly contracted pupils. He was cupped to ten ounces, and cold lotion applied to the head. Pills continued. He felt relieved by the cupping. Face pale; pulse low. In the night he had a fit of insensibility, with some muscular rigidity of the lower limbs.

No alteration was observed on the 4th or 5th, but the pain is so severe as to render him at times faint and insensible. The surface is covered with a cold clammy perspiration. Calomel and antimony continued. Blister behind the ears.

6. At 5 P. M. he had another fit of insensibility, with considerable rigidity of all the limbs, which lasted about a quarter of an hour. This returned, and he died at 3 A. M. on the 7th.

The body was examined twelve hours after death, when the *dura mater* and arachnoid were found to be healthy. There was considerable hypertrophy and hardening of the right cerebral hemisphere; it appeared much larger than the left, the mesial line being much to the left side of the *foramen magnum*. There was a large collection of limpid serum in the lateral and third ventricles, and the right hemisphere of the cerebellum was distended by serum. The medullary substance of the cerebellum was healthy; the passage from the third to the fourth ventricles much dilated.

No morbid appearances were observed in the thoracic viscera, and the only mark of abdominal disease was excessive vascular congestion of both kidneys.

There have been a few cases of epilepsy and *delirium tremens* during the year; but scarcely any in which the symptoms were at all peculiar. Among those of epilepsy was one in which the epilepsy was combined with amaurosis of both eyes, permanent dilatation of the pupils, considerable prominence of right eye, and convulsive twitchings of left side of body. The principal point of interest in the case was that the dimness of sight first came on while he was taking full doses of digitalis, for this is so far corroborative of the observations of others, that digitalis has some power in producing amaurosis.

Of the cases of *delirium tremens* three only presented anything peculiar; one from being complicated by cut throat, which, however, only required the ligature of small vessels; another, who was excessively violent, having been bled on shore. The only point of interest in this case was the large quantity of opium that was required to produce sleep, and the very speedy recovery. One evening he took a drachm of the tincture of opium, another drachm in half an hour, and an hour afterwards half a drachm of Battley's solution with half a grain of morphine, with scarcely any effect. The next day he took, in one dose, four grains of solid opium and ten grains of camphor without inducing sleep, and this was followed the next night by the black drop in porter, of which he took 130 drops within two hours in divided doses. After this

he slept well and recovered without a bad symptom. The third case was of interest, from the remarkable manner in which the patient talked and sang with scarcely any intermission for several days.

Captain Palliser, R. M., between 50 and 60 years of age, of a sanguineous temperament, and very jovial habits, was put on the list, March 6, suffering from dyspnœa, which was greatly increased on the least exertion; dyspepsia, heat of skin, foul tongue, and œdema of the lower extremities. He was bled, and recovered so as to walk about and go to drill; but the same symptoms returned, and he was again bled to eight ounces. Debility ensued, with great nervous excitability, and no sleep for three days before admission.

He had small quantities of wine with opium, but not more than forty minims of the laudanum.

On admission the surface of the body was warm, the face flushed, but not more so than habitual with him. Head not hot, and does not complain of pain. He was in a state of complete hallucination, continually, incessantly talking and singing. The senses all greatly exaggerated; eyes wild and staring; vision and hearing excessively acute, and he starts at the slightest touch. Not violent in his movements. Sounds and action of heart feeble. Pulse 90, and soft. Complains of occasional gastric pain and flatulence. Tongue rather foul. Was freely purged yesterday, and is rather smartly salivated. He was ordered porter, beef-tea, and arrow-root; and at seven P. M. a draught, consisting of one drachm and a-half of the sedative liquor, and one ounce of camphor mixture. He continued very talkative and excitable, and at eleven P. M. he took forty minims of the black drop. After this he slept, but only for a quarter of an hour; and at two A. M., (April 5,) he took thirty drops more. After this he slept nearly two hours, but throughout this day he continued talking or singing without intermission. He appeared in a most exhilarated flow of spirits, forming impromptu rhymes of a most amusing character, and occasionally putting a company through the operations of a field day. Bowels freely open.

The head was shaved, and cold lotion applied, and afterwards a strong ointment of tartarized antimony rubbed in. In the evening he took fifty minims of the black drop, and slept a little during the night.

April 6. Appears better, though still continually talking. Has had two enemata of turpentine and castor oil, neither of which have operated. At one P. M. he took one drachm of compound powder of jalap, which operated once, and at five, five grains of calomel, followed by forty minims of black drop. Slept half an hour, and at ten took twenty-five drops more; but had no sleep during night.

7. Quite as excitable and talkative as before. Hears the slightest whisper at the other end of the room, and saw the time on a small watch at a distance of upwards of fifteen feet. Towards evening he became much more violent than ever in his motions. The bowels were not opened until six P. M., and then a watery stool passed. Continued wakeful throughout the night.

Ten grains of calomel, followed by three doses of *Pulv. Jalap. Comp.* ʒi. Two grains of calomel every third hour.

8. Slept from five until eight A. M. Is tolerably quiet, and rather more sensible. Pulse 100, regular and soft. Bowels well open. Urine very high coloured, alkaline, depositing very copious yellow sediment; not albuminous.

The calomel was continued. Ten P. M. thirty minims of the black drop.

9. Slept well during night; more collected, and says he has been dreaming.

Porter, calomel, and beef-tea as before.

10. Slept well without an opiate; quite sensible; considerable abdominal distension, and some tenderness.

Three grains of calomel were given, followed by two ounces of compound infusion of senna.

11. Slept well; quite sensible, but very feeble; pulse very soft.

Thirty minims of black drop ordered at bed-time.

He continued improving for some time, and never had any return of the *delirium tremens;* but about the middle of May he began to become anasarcous, and afterwards ascites came on, and he was invalided, and sent to England July 4. He is since dead.

Among the diseases of the nervous system, a case occurred of a very singular nature, as follows:

Gonorrhœa and Phymosis; sudden death; extravasation of blood, and effusion of lymph in theca vertebralis.—E. Marshall, marine, aged 21, of a sanguineous temperament, but previously quite healthy was placed on the sick list, December 9, 1841, for gonorrhœa and bubo. After having been almost cured the gonorrhœa returned with considerable severity, accompanied by phymosis, which rendered it necessary to divide the prepuce. On admission there was an open sore in the groin, and very considerable swelling of the prepuce.

A poultice was applied in the evening, and he took forty minims of laudanum.

Feb. 13. No peculiar symptom.

He took an aperient draught, and a poultice was applied to the penis.

14. Much the same. A solution of sulphate of copper was applied to the penis.

At about eleven A. M. he complained of pain in the left canine tooth, and sent for the assistant-surgeon to request him to draw it, who, however, applied some creosote. In about half an hour he was taken in a sort of fit, being insensible, and gasping for breath. This state continued for ten or fifteen minutes. He took some ether, and on coming to, said he had had a most intense pain in the penis, scrotum, and perineum, with erection, and a sensation as if the parts were bursting, which had caused him to faint. Some priapism remained, and there were marks of semen on the linen. In about half an hour another erection came on, he fainted, the respiration became very laborious, the intervals between the inspiration longer

and longer, and in ten minutes he was dead. In the interval between the fits he said he had no pain in the head.

Inspection of the body twenty hours after death.

Brain and its membranes healthy, except slight adhesions of arachnoid on upper surface of left hemisphere and under surface of cerebellum. Cerebellum rather softer than usual towards its inferior surface, but quite healthy in appearance. A large quantity of dark fluid blood issued from the spinal canal after the removal of the brain, and the surface of the spinal marrow from the first to the fourth cervical vertebra, and from the third to the eighth dorsal, was covered with adherent coagulated blood. In the latter situation also a considerable quantity of coagulable lymph had been effused, surrounding and adhering to the chord. The spinal canal throughout had evidently contained blood; but the source of the hæmorrhage could not be discovered.

All the thoracic and abdominal organs were healthy except the kidneys, which were highly congested; and the left kidney contained a small quantity of purulent matter in its pelvis. The bladder was contracted and nearly empty, but contained a little urine mixed with purulent fluid. The prepuce was distended with sero-gelatinous fluid. The nerves of the penis and of the sacral and lumbar plexus were carefully examined, but they showed no sign of morbid action.

The cases of Injury of the Head have been of considerable interest, and several are worthy of notice.

Depressed fracture of left temporal bone; coagulated blood beneath temporal aponeurosis preventing discovery of depression; coma; stertor; death.—James Hobbs, marine, aged 20. At noon, on the 14th February 1842, while walking from the gangway to go down to the main deck, a cask of flour struck him on the left temple and threw him down to the main deck, which he struck with his right temple. He was taken up insensible; but after some little time desired to be put to bed. He would not, however, answer any question. The pulse was slow and feeble, and considerable bleeding took place from left ear, and from the nose and mouth. Swelling and discoloration on right temple followed.

He took a dose of ammonia, but rejected it by vomiting.

On admission, 2 P. M., the state of surface was natural, the countenance somewhat flushed and rather turgid. He appeared perfectly insensible to impressions of any kind. There was a wound over the right eyebrow, and considerable discharge of blood and bloody serum from left ear. Pupils natural. No convulsive motions. Respiration 20 per minute; no stertor, but breathing rather heavy. Does not speak, moan, nor cry. Sound and action of heart healthy. Pulse 58 and feeble. About half an hour after admission vomited some blood and frothy mucus, and appeared to know that he was vomiting, as he turned to the basin.

Enema commune.

8 P. M. Pulse 70; face rather more flushed; skin cool.

10 P. M. Pulse 68; passed catheter, and drew off about a quart

of urine. He seemed sensible of it, saying, "Don't punish me, doctor." No marks of injury of the head, except on right eyebrow.

15. 8 A. M. Pulse 60; pupils natural; respiration rather heavy; skin natural; bladder appears a little distended, but he soon after called for the utensil. Bleeding from the ear continued in small quantity throughout the day. During the night he passed urine involuntarily, and became very noisy.

16. Pulse 110; face rather flushed, but skin not hot; breathing more laborious towards afternoon. Sixteen ounces of blood were drawn from the arm. Soon after the bleeding, the pulse rose to 160, and by 5 P. M. the pupils were dilated to the utmost; the breathing became more laborious, though never stertorous, and he died at 8 P. M.

Inspection of the body fourteen hours after death disclosed the following appearances:

Extravasation of dark coagulated blood beneath the left temporal aponeurosis, and among the fibres of the muscle, keeping the aponeurosis quite tense. A portion of the squamous division of the temporal bone on this side was driven inwards. It was about the size of a sixpenny piece, and the fracture had extended into the external meatus, and across the petrous portion of the bone, as far as the *foramen lacerum arterius*. The *dura mater* was uninjured, but was separated from the bone for a considerable extent by a dark coagulum. Both layers of arachnoid over left hemisphere were opaque and covered by a puriform exudation. The substance of the brain was healthy.

The heart was distended by fibrinous coagula, and the depending parts of both lungs were in a state of cadaveric congestion; abdominal viscera healthy.

This case is interesting, as pointing out a source of difficulty in discovering a depression of bone not often noticed.

The two following cases are of interest, as they show that bleeding from the ear, by many considered to be a fatal symptom, is not in all cases so. They are strengthened by two others very similar at present in the hospital, which will fall into the report of next year.

Fracture of parietal and frontal bones; coma; bleeding from the ear; recovery.—Francis Symes, painter, aged 23, at 2.40 P. M. January 20, fell through the windsail hatchway at the break of the quarter-deck, down upon the tanks in the main hold. He was taken up insensible, with fracture of left clavicle and extensive laceration over right fronto-parietal region. There was oozing of blood from right ear, and ecchymosis around right eye and beneath the conjunctiva, with considerable protrusion of the globe of the eye.

On admission, the surface was pale and cool, not cold, and he was continually throwing his arms and legs about, though not convulsively. He was continually moaning, or talking and muttering over letters which, it appeared, were marks on hammocks which he had been painting. The eyes were closed; pupils not dilated, and perfectly contractile. There was a large thrombus beneath the la-

ceration, which was freely divided, and a fracture at once detected running towards the orbit. No stertor; pulse 65, feeble; no vomiting; drew off a little urine by catheter; the head was shaved; warm fomentations applied to wound, and the limbs secured by sheets, so that he could not throw them about. Trephining was proposed, but objected to, as there were no evident signs of depression, and the marks of compression were not sufficiently strong to warrant a search for extravasated blood, the situation of which was doubtful.

21. 10 A. M. Reaction having come on in some degree this morning, he was bled to 12 ounces. At 11. 30, he appeared much more comatose, and the breathing was stertorous for about a quarter of an hour. He then returned to the state of talking and moaning restlessness, which had continued the whole night.

A common enema was administered.

2 P. M. Passed urine involuntarily; quieter; pulse 84.

4 P. M. Injection brought away two free evacuations of black fæces. Pulse 100; very general perspiration.

8 P. M. Quieter; pulse 96; sweating continues.

22. Much the same during night.

10 A. M. Pulse 96; respiration 34 per minute; pupils still contractile; no stertor; has passed urine, but bowels not open.

3 P. M. Pupils more sluggish; slight bleeding from the ear has recurred.

A common enema was administered.

8 P. M. Pulse 72, irregular; respiration 20; left pupil contractile; right not dilated, but rather enlarges than diminishes on candle being brought near; slight snoring and puffing of lips; quieter, but occasionally breaking out into incoherent expressions; slight fæcal discharge after injection.

23. 9 A. M. Much the same, though less restless; pulse 56; respirations 20; pupils rather sluggish.

4 P. M. Pulse 64; has not passed urine; introduced catheter, but the bladder was nearly empty; has continued to-day and yesterday to take arrow-root and fluids; and seemed to-day more sensible, as his eyes followed the motions of those around him.

24. 9 A. M. Pulse 66; respiration 20; pupils contractile; pretty quiet; passes urine involuntarily.

9 P. M. Pulse 90.

25. Pulse 90; much more sensible. When asked how he was, said "I don't know yet," and gave equally rational answers to other questions. Passes urine and fæces involuntarily.

Left clavicle put up in the usual manner with a figure of 8 bandage.

26. Much the same; pluse 64; respiration 22; pupils perfectly contractile; urine and fæces still pass involuntarily.

27. Pulse 68; some intolerance of light and tendency to coldness of extremities, which continued without any other change during the next two days.

30. Lies in a semicomatose state; pupils contracted; pulse 60; when roused, moans a little, but answers questions rationally, although he cannot hear unless he is spoken to in a very loud voice.

One drachm of the compound jalap powder was given.

31. Same as yesterday, but rather more comatose.

February 1 and 2. A little improved.

3. During night had a rather copious epistaxis; seems rather more sensible.

4. Slight epistaxis returned this afternoon.

5. Right pupil more dilated than left. Wounds on head granulating rapidly.

6. Lies perfectly still, but puts out his tongue on being told to do so.

7. Said he was better.

9. Still very quiet and dull, but answers questions rationally. Pulse 80; pupils natural; bowels open.

15. Has gradually improved, but complains of pain in right ear.

16. Pain in ear gone off.

After this he gradually became stronger and more intelligent, and was invalided and discharged for a passage to England, March 2, being in a very fair state of health, and without any cerebral symptoms.

William Walker, aged 24, steward's mate, of a slight make, on the evening of the 2d April 1842, fell through the hatchway from the middle to the lower deck, and was taken up insensible. There was a wound over right parietal protuberance, and a discharge of blood from the right ear. No fracture could be detected. Pulse 90, regular, and full; skin warm and moist; pupils contracted; vomiting of contents of stomach mixed with blood.

Blood was drawn from the arm to 16 ounces; and the head shaved, and cold lotions applied.

During the first five days after admission he appeared as if all the powers of his nervous system were in a state of extreme depression. He lay perfectly insensible, except when roused, and then answered questions rationally; but seemed to have great difficulty in comprehending the import of simple questions. He was pale; pulse feeble, never above 60; skin cool.

He was purged, kept perfectly quiet, and took mercury.

After the first week he gradually recovered without a bad symptom, and was discharged quite well, April 19.

It is a fair subject for inquiry, in this case, whether the first bleeding did good, by preventing inflammation; or harm, by protracting the effects of the shock.

The following cases show how much may be done in very severe cases of injury of the head by carefully combating symptoms as they arise, and avoiding all hasty and harsh methods of treatment.

John Boyland, aged 17, H. M. S. Howe, a strong healthy boy. On the morning of the 9th of February 1842, while coming down the mizen rigging, one of the ratlings gave way, and he fell from about half-way down the mizen shrouds on to the poop, alighting on his head. He was immediately carried to the sick berth in a

state of stupor. The scalp was shaved, a wet night-cap was put on, and he was sent to hospital.

On admission the countenance had a good colour, but was expressive of pain. The state of surface natural. There were marks of contusion on right lumbar region and crista of right ileum. The right arm appears to droop a little, but no injury about the shoulder could be discovered. He frequently put his left hand to the right shoulder. Contusion of right knee. There was a swelling nearly the size of an egg over the anterior inferior angle of right parietal bone. No fracture could be discovered. Is perfectly insensible to anything about him, and does not appear to know that any one speaks to him. Whenever roused or moved in any way he cries in a peevish whining manner for some time. Pupils slightly dilated. Pulse 100, small. Low diet; warm fomentations to head; gave a common enema which brought away a lumpy stool. Soon afterwards he passed urine involuntarily in bed.

9 P. M. Venesection to sixteen ounces.

10. 9 A. M. Pupils perfectly contractile. Has shown no sign of intelligence. Dozes with a snore. Pulse 100.

Ten grains of calomel and six of antimonial powder were ordered to be given immediately.

8 P. M. Pulse 80. Bowels freely opened. Passes urine and fæces involuntarily. He puts out his tongue on being told, but will not answer any question. Cries out when roused. Pupils natural.

11. Has been continually screaming throughout the night. Some intolerance of light. Pupils natural. Pulse 100. Urine and fæces pass involuntarily. Will not speak.

A purgative enema was administered, and twenty-four leeches were applied to the temples.

1 P. M. Has been incessantly screaming in a very sharp key all the morning.

Vespere. Quieter.

12. Quieter all day. Pulse 68. Follows the motions of those about him with his eyes, but will not speak.

13. Appears better. Pulse 78. Face rather flushed. Pupils slightly dilated and sluggish. Quiet. He puts out his tongue, but does not speak.

14. Became excessively noisy this morning, screaming continually, with scarcely an interval of quiet, until 5 P. M. Pulse 70. Skin cool. Bowels open. In the afternoon he recognized two shipmates, and told them in correct detail how the accident happened.

15. Quieter. Will not answer questions. Towards afternoon he became more noisy, singing a long series of indecent songs. Face rather more flushed. Pulse 90.

After this he gradually improved, and, by the 26th, he was walking about the ward; talking rationally, and with a pulse, tongue, and skin quite healthy. He was discharged quite well on the 18th of March.

James Gill, aged 24, H. M. S. Thunderer, ordinary seaman. On the 22d February 1842, whilst raising a grating from the after-

hatchway on the main deck, he fell with the grating down into the hold. He was taken up completely insensible, with dilated pupils. This state continued for two hours, when vomiting came on and the pulse slightly improved; the pupils became less dilated; and the heat of skin increased. On being asked if he compained of any thing, he pointed to his right side. About 10 P. M. eight ounces of blood were taken; he became faint, and not rallying, was sent to hospital on the 23d.

23. On admission, 8 A. M. the surface of the body was pale and cool; the countenance had a sharp contracted appearance, and he seemed to wish to lie on the right side. The head was shaved, but no depression could be detected, though he moved uneasily when pressure was made above the right ear. He was perfectly insensible; pupils greatly dilated; no convulsions; respiration laborious, but not hurried or stertorous; moans a little. Passed catheter and drew off about a pint of urine. Pulse 100, small.

10 A. M. The pulse has sunk to 48. Throughout the whole of the day he continued perfectly insensible, the pulse varying from 48 to 60, and the pupils sometimes both contracted, at others both dilated; the urine and fæces passed involuntarily.

24. Still insensible; pupils variable, but never natural; urine and fæces still passed in bed; respiration laborious; face better colour.

25. No change.

26. Still insensible; breathes in a gasping manner; pulse very irregular, almost intermitting; pupils dilated, but contract under a strong light; no convulsions.

27. Pulse rather stronger; no other change.

28. Towards afternoon became partly sensible; said what ship he belonged to, and how the accident happened.

March 1. During the next week he continued partially sensible, talked very absurdly, and his ideas seemed quite unconnected. The pulse continued very irregular. From the 7th to the 12th of March his intellect became less clouded, and on the latter day he got up and walked about a little. He continued gradually improving, obstinate constipation of the bowels being the only symptom of deranged health; and he was discharged well on the 19th of April.

He was, however, readmitted in about two months with some degree of dulness of intellect, and a feeling of heaviness in the head. This was during the heat of summer, and he was therefore invalided, and sent to England.

John Turner, aged 19, H. M. S. Howe. On the evening of the 20th April 1842, while coming down mizen rigging, his foot slipped, and he fell over board, but was immediately rescued by a man who sprung after him. He was brought on board insensible, with dilated pupils and stertorous breathing. Pulse full and quick.

Head shaved; cold lotions applied.

At ten P. M., reaction having taken place, he was bled to fourteen ounces, and purged by a scruple of calomel and an enema.

He vomited once during the night, and the bowels acted.

On admission on the morning of the 21st the surface was warm, and the face rather flushed. He lay insensible, but when roused, appeared partially capable of understanding a question; pupils natural; all the senses appear deadened; no convulsions; respiration heavy, but not hurried nor irregular; sounds and action of heart rather feeble; pulse 100, soft; some throbbing of temples. There was a wound of the scalp, about an inch in length, over the occipital tuberosity, and swelling and ecchymosis on the left side of the head.

22. Lies perfectly still; pulse 90, soft; insensible; pupils natural; urine and fæces pass involuntarily, though he appears to be aware that they are passing.

23. Put out his tongue on being told. Does not speak.

24. Still perfectly quiet. On being roused answered one or two simple questions rationally. He lay for several days in a state of partial sensibility, without any sign of constitutional disturbance or local disease, and was discharged in a good state of health on the 10th of May.

Before leaving the cases of injury affecting the centres of the nervous system, a case of fracture of the sacrum calls for notice.

James Fulton, aged 26, H.M.S. Cambridge, June 6, 1842.—Whilst at work upon the foreyard, he fell with great force against the swinging boom. He was taken up insensible, and when he recovered sufficiently, he complained of pain across the lower part of the chest and epigastric region, and numbness of lower extremities, with total loss of power over them.

On admission he was pale, and the surface was covered by a cool clammy perspiration; he lay on his back. There was complete paralysis of sensation and motion in both lower extremities. He felt no touch on any part of the limbs until just below Poupart's ligament. The sensibility of the parts from this situation to the epigastrium was much deadened, though not abolished. The respiration was rather hurried, the voice low, and, a few days after admission, cough began to be very troublesome, accompanied by a copious, frothy, and afterwards sero-purulent expectoration. The sounds and action of the heart continued greatly oppressed, and the fæces and urine passed involuntarily from the first, and continued to do so the whole time he remained in hospital. He became much emaciated, and towards the end of July, began to pass pure purulent matter, both by the urethra and anus; bed sores became very troublesome, the cough incessant, emaciation increased, and he died, a complete skeleton, on the 22d of August. With regard to the treatment, he was kept perfectly quiet, and simple palliative remedies given as occasion required.

Autopsy twelve hours after death.

Extreme emaciation, extensive sloughs, with sphacelus of all the tissues between the skin and bone, over sacrum, both trochanters, the heads of both fibulæ, both ankles and both heels. A slough had

also formed over the ball of the great toe of the right foot, apparently independent of pressure.

No marks of disease in the lungs or bronchial tubes. Heart healthy, but three ounces of serum in cavity of pericardium.

Liver and spleen healthy; patches of injection of mucous membrane of small intestines. The large intestines throughout, when filled with water, were of an enormous size, certainly twice their natural calibre. There were a few spots of ulceration in the mucous membrane of the rectum. The peritoneum throughout the pelvis, and its parietal layer for a considerable distance over the abdomen, was of a black colour from gangrene, or more probably from spurious melanosis of the subserous cellular tissue. Both kidneys were enlarged and sofetned; the ureters larger, thicker, and more vascular than usual. Bladder thickened and contracted; its mucous membrane congested, with several calculous deposits adhering to it.

There was a transverse fracture of the sacrum, which had completely separated the second from the third division of the bone. The nerves passing through the adjacent foramina were very soft, almost fluid. The cellular tissue connecting the *theca vertebralis* with the bony canal was quite black, as high as the 10th dorsal vertebra. Slight softening appeared to be the only change that had taken place in the *medulla spinalis*.

Of the diseases of the organs of the senses, those of the eye have been of the most importance. There have been three severe cases of gonorrhœal ophthalmia, and two others of very acute conjunctivitis, accompanied by chemosis, and followed by sloughing of the cornea and partial prolapsus of the iris. In one of these it resulted from a wound. There have been also cases of chronic ulceration of the cornea, and one of hard lenticular cataract confined to one eye. There have also been two cases of syphilitic iritis. The only manner in which the treatment has differed from that usually adopted is in the very free application of the solid caustic to the conjunctiva, even during this acute stage of inflammation, often with the best effects. In one case where the chemosis was so great that sloughing of the cornea appeared inevitable, Mr Tyrrell's mode of dividing the conjunctiva *in radii* was most successfully adopted.

The only case of *fistula lachrymalis* that we have had during the year was of considerable interest. It occurred in a man named Coniam, aged 24, belonging to H.M.S. Impregnable. He complained first of violent toothach; in a few days distension of the lachrymal sac came on, with inflammation of the superjacent integuments, and during the next six weeks the case was treated as one of *fistula lachrymalis*. It was then observed that there was some protrusion of the right eyeball, which increased during the next four days, and was accompanied by diplopia. The tuberosity of the right maxilla was found to be enlarged; and there was a

swelling, about the size of an olive, in the hard palate, which had a distinct pulsation. A growth resembling a polypus also showed itself in the right nostril. This one day bled a little, and the passage through the nasal duct was clear for a few hours. The general health was not much affected. It was concluded that there was malignant disease of the antrum, and he was accordingly invalided and sent to England, and we have not heard how he has since gone on.

The diseases of the organs of respiration have been very numerous, and of these, phthisis alone has caused the death of 17 patients, upwards of 30 per cent. of the whole of the deaths for the year, being about the average which has been observed in former years. In three of these cases both lungs were affected in an equal degree; in three, the right was the principal seat of the disease; and in the remaining eleven, the left; the deposit apparently having commenced in the upper lobe of the left, then affected the upper lobe of the right, then lower lobe of left, and, lastly, the middle and lower of right; and this only in the most advanced stages. It is singular that most of these men died during, or immediately after, a prevalence of winds from the shores of Syria or Lybia, (the Scirocco and Liebeccio,) and it has been several times remarked how rapidly the disease ran its course under the almost poisonous influence of the former. We have seen in five or six cases, men who came in with mere symptoms of bronchitis, and in whom a slight dulness under one clavicle, a little variability in the intensity of the respiratory murmur in the two infra-clavicular spaces—a slight prolongation of the sound of expiration, or a slight increase in its intensity, were the only signs of the commencement of the more severe disease; yet in a month these very men were in a state of incurable phthisis, with dulness over the whole upper part of the chest, loud gurgling sound, and all the general signs of advanced phthisis. In two cases, six weeks was the extreme period from the signs of commencing deposit, above enumerated, to the fatal termination; and these men, in common with almost every person affected with pulmonary disease, complained greatly of the depressing effects of the scirocco.

With regard to the symptoms and physical signs of phthisis, hæmoptysis was present in rather less than a third of those who died, and in about the same proportion of those invalided in whose cases the disease was clearly manifested by auscultation. In only one case was an open vessel discovered from which the bleeding proceeded. This case was somewhat peculiar from the large amount of the hæmorrhage, and therefore requires a short notice.

Thomas Appletett, aged 32, H.M.S. Phœnix, May 29, 1842.—A tall robust person, quartermaster of H.M.S. Phœnix since Sep-

tember 1841 had had more or less spitting of blood, and on the 5th of March 1842, was put on the sick list with cough, dyspnœa, pain on inspiration, hæmoptysis, and febrile excitement. He was bled, blistered, and cupped, and took tartar-emetic with sedatives, with good effect. He was sent to hospital May 29, 1842, but except an occasional streaking of blood in the sputa, he presented no dangerous symptom until the 4th of September, when the hæmoptysis increased, the blood being ejected florid and quite fluid, and almost immediately coagulating. He had a healthy appearance; the face was florid and state of surface natural.

The respiration was a little hurried on any exertion, the voice full and strong, and there was a rather troublesome but not violent cough. There was dulness on percussion over right infra-clavicular and mammary regions, but not strongly marked, and in the same situation loud sibili, curiously combined with moist rhonchi. The sounds and action of the heart were rather louder and stronger than usual, the second sound being very loud, and heard towards the right shoulder. There is some thirst; bowels open; urine natural.

Three grains of sugar of lead were ordered to be taken three times daily. Three drachms of bitartrate of potass were ordered to be given according to symptoms.

During the next four days there were several returns of the hæmorrhage, which, however, appeared to be controlled for the time by the full doses of cream of tartar.

8. This morning the hæmoptysis increased so greatly that he spat in a few minutes upwards of half a pint of arterial blood. He was bled to sixteen ounces, and the pulse became fuller and softer than before. Within twelve hours the bleeding recurred, and he spat upwards of half a pint more. Since the 4th he has certainly spat half a pint daily.

9. Until this morning there has not been much depression, but he is now becoming blanched and low spirited, with a feeble voice.

In consequence of the recurrence of hæmorrhage, large doses of the tincture of muriate of iron were given during the night. Acetate of lead continued.

10. There is a blue mark on the gums around the edges of the teeth, showing that the lead has begun to affect the system, and there is slight colic. He has had two returns of hæmorrhage today, about six ounces each.

Omit acetate of lead. Free doses of alum given with opium and diluted sulphuric acid.

11. This afternoon spat about eight ounces of blood.

13. No return since the 11th. The stools for the last two days have been fluid and as black as ink, probably from the action of the lead, or the alum and acid upon the fæcal matters. There are loud sibili throughout right side of chest, and gargouillement just over right nipple. Sounds of heart loud, action feeble. Puerile respiration in left lung.

Continue alum and acid.

14, 15. During these two days there was scarcely any return of hæmorrhage, but the dyspnœa increased; loud cavernous respiration was heard in the right infra-clavicular region; he gradually became weaker, and he died on the 15th at 5 A. M.

Inspection twelve hours after death disclosed the following appearances.

Heart healthy, as were the aorta and all the large vessels of the thorax. Both pleuræ adherent throughout. Both lungs extremely œdematous; left otherwise healthy; lower lobes of right slightly congested; upper lobe partially hepatized, containing a few granular tubercles and three cavities about the size of a walnut, each lined by a false membrane. Bronchial mucous membrane perfectly healthy, and neither in this nor in any of the cavities was there any trace of blood or coagulum. One of these cavities, situated in the anterior part of the lung corresponding to the space between the second and third ribs, contained several pieces of rough calcareous matter partly adherent to the lining membrane of the cavity, and into this cavity an artery opened of a calibre sufficiently large to admit a common probe. It had the appearance of having been mechanically opened by the calcareous matter.

With the exception of slight intestinal injection, all the abdominal viscera were healthy. The intestines contained much black matter, which was simulated by adding acid to the bile. The blood throughout the body was highly fibrinous, and there was fibrinous coagula in the cavities of the heart and in all the large vessels.

Among the physical signs of cavities, the *bruit de pot fêlé* of Laennec was observed very distinctly in one case from the second to the fourth rib anteriorly on the right side, with occasional cavernous respiration, and, at other times, metallic gurgling and pectoriloquy. A very large cavity was recognized and found on dissection. Pectoriloquy has not appeared of much value in diagnosis, as in numerous cases where there were large cavities, or a number of small communicating ones, it was not present. In one case of a man who was invalided, it was very distinct and constant over the posterior part of the lower lobe of the left lung.

In the diagnosis of cases of incipient phthisis from those of chronic bronchitis, attention to the sound of expiration has been of great service. During the very earliest stages of the disease, before any general symptoms have led to suspicion, before there was any dulness evident on comparative percussion of the two clavicles, or below them, an alteration in the intensity of the respiratory murmur has led to fears which have invariably proved but too well founded. In the healthy man the respiratory murmur is almost wholly formed by the sound of inspiration, that of expiration being scarcely audible, or merely occupying about a fifth of the time of that of inspiration; while, on the contrary, in the most incipient stage of phthisis, the expiratory sound is as long

and as loud as that of inspiration, and occasionally both longer and more intense. When this is detected more in the upper lobe of one lung than in that of the other side, and is followed by any dulness on percussion, there is very strong ground for the inference that the part is occupied by tubercles.

The pleura has in almost all the cases of phthisis been more or less involved. Adhesions have been almost universal, and in some cases, the false membrane has been infiltrated by a semi-gelatinous fluid, which had caused a very audible superficial crepitus, heard most distinctly above the deeper sounds of gurgling or cavernous respiration. In two cases this state of pleura was recognized before death and verified on dissection, and was audible in several of the cases of men invalided.

Passing from the tubercular to the simple diseases of the lungs and pleura, we must first notice three cases of gangrene of the lung.

Morgan Jones, aged 28, H. M. S. Devastation, stoker, complained, on the 16th June 1842, of catarrh and slight pain of chest, without pyrexia. On the night of the 17th he was suddenly seized with pain in the right hypochondrium, extending up the chest to the shoulder of the same side. The abdominal muscles were intensely rigid, and he was unable to remain recumbent. Camphor mixture was given with ether and opium.

18. He was bled to fourteen ounces, and twelve leeches were applied to the side, followed by hot fomentations.

He remained free from pain during the next four days.

24. On admission the surface of the body was particularly cold and cadaverous, countenance dull; he appeared rather deaf and somnolent, but did not complain of pain. Warm bottles were applied to the feet, and an enema given.

He rallied a little, but the pulse remained very soft: there was much cough, with sero-mucous expectoration. The sound on percussion was clear anteriorly, dull posteriorly as he lay, but on raising him the chest became dull as high as the fifth rib. The respiration was cavernous, with gargouillement in the right infra-clavicular and supra-mammary regions; in the left side it was exaggerated throughout with loud bronchial rales. The action of the heart was turbulent, irregular, and oppressed, but without morbid sounds. There was considerable fulness in right hypochondrium, and some tenderness on pressure. Tongue parched and furry. The enema brought away a very fetid stool. The breath had a cadaverous odour, and was fetid when near him; but it was not so powerful or sensible at so great a distance as is usual in cases of pulmonary gangrene. As he was evidently moribund, we did not trouble him by a more minute examination than to satisfy ourselves of the presence of a cavity in the right lung and fluid in the pleura.

Wine was given in repeated small doses; but on the 25th he continued to sink; the bronchial rattles were very loud, pulse soft, skin

pale with a cadaverous blue tint, and he died on the morning of the 26th.

Autopsy twenty-two hours after death. Heart healthy, but distended by coagula of fibrin. Great part of the upper lobe of the right lung was reddish-black in colour, and of the consistence of hepatized lung; but, towards its central part superiorly, and towards the surface opposed to the middle lobe, it was converted into a putrid pulpy mass, in which shreds of the pulmonary tissue and obliterated vessels were floating. Superiorly it was circumscribed by the adhesive inflammation, but at the lower part of the lobe the sphacelus had advanced to the surface of the lung and caused perforation of the pleura. The upper lobe being firmly adherent to the *pleura costalis*, the putrid fluid effused had excited inflammation of the pleura of the lower lobes only, and the corresponding costal portion, which was covered by several layers of lymph. In the cavity were several ounces of putrid dirty serum. Several bronchial tubes communicated freely with the gangrenous cavity. There were both œdema and emphysema of parts of the left lung, with considerable dilatation of the smaller bronchial tubes. The mediastinal and bronchial glands were considerably enlarged.

The liver was considerably enlarged and mottled in appearance. Stomach and intestines healthy. Left kidney healthy. In the right kidney some portions of the tubular structure were displaced by a light-coloured granular tissue, continuous with the cortical portion.

Remarks.—This case and the two following are instances of a form of disease (opening of a gangrenous abscess into the cavity of the pleura) so rare that Laennec and Andral only mention one case each. In the case of Jones, the enlargement of the mediastinal and bronchial glands was so great that I have no doubt the pressure they exerted upon the vessels at the root of the lung had considerable influence in inducing the gangrene. It appears probable that the perforation of the pleura took place on the 17th.

James Croker, H. M. S. Indus, marine, aged 26, of a robust habit, complained of pain in the right hypochondrium on the 21st of March, and was bled to sixteen ounces.

On the 22d the pain continued and was increased on inspiration; and on the 23d he was again bled to eighteen ounces, and digitalis given with tartarized antimony.

24. Cough and mucous expectoration came on, and dyspnœa, which rapidly increased; and he was admitted on the 26th, when the surface was cool, moist, and bluish-white in colour; the countenance very pale, and lips blue. He lies on the back with the shoulders raised, being unable to lie on either side. No affection of head, but says he has not slept for three days. The respiration was laborious, with great heaving of the chest, particularly at the upper part; voice low; cough, but not very frequent; viscid expectoration rather copious; complete dulness on percussion below

right nipple, with extreme tenderness and absence of respiratory murmur. Voice is so low that nothing can be learned from its resonance in determining if the dulness depends on solidification of lung or effusion into pleura. Sounds of heart louder than usual. Pulse 90, soft. No pain or tenderness of abdomen. Percussion shows no enlargement, or pressure of liver downwards. Thirst very great. Tongue a little furred. Urine scanty. An injection was given, which brought away copious dark offensive evacuations.

27. He appeared rather easier throughout the day. There was no alteration in the physical signs.

28. Pain in side more considerable, but not suddenly increased. He appears very low, and the breath has a cadaverous odour and a cold feeling.

29. Evidently sinking; distinct gurgling under right nipple; pulse 70, soft; much pain in right side; breath more fetid and quite cold. He gradually sank throughout the night and died at 3 A.M.

Autopsy seven hours after death. Heart enormously distended by fibrinous coagula; left lung healthy; upper and middle lobes of right lung highly emphysematous, lower lobe hepatized. The morbid action had been more intense towards the lateral aspect of the lobe, and a portion of the lung, about the size of a walnut, was in a state of mortification. A process of natural cure had commenced by effusion of coagulable lymph around the slough forming a cyst; this cyst was almost complete, but at a spot where the pleura alone interposed between the slough and the pleural cavity communication between the two had taken place. There was a considerable effusion of fetid sero-purulent fluid in the cavity, and the pleura was covered by several layers of dark-coloured flaky adherent lymph. Liver congested; both kidneys were the seat of homogeneous deposit.

The following case is chiefly remarkable on account of the long continuance of fetid expectoration.

Pericarditis; pneumonia; fetid expectoration for three weeks; effusion in upper part of pleural cavity; death.—Mr C. H. Bostock, aged 18, H. M. S. Howe, clerk, on the 4th of November, complained of pain in the cardiac region, with some cough and dyspnœa. He had great thirst and some heat of skin. Pulse 96, rather hard and sharp. He was freely purged, and in the evening all the symptoms became much aggravated, with pungent heat of surface and a full bounding pulse. He was bled and sent to hospital next morning. He had previous attacks of a similar nature, and his general health had suffered considerably.

He walked up to the hospital from the boat, but was much exhausted; breathing with considerable effort, but without pain. The action of the heart was hurried and irregular, and there was dulness on percussion in the cardiac region, and indistinct deep-seated crepitation over the lower lobe of the left lung. In other parts of the chest there was puerile respiration. Pulse small and irregular, 100.

Low diet; ten grains of calomel and one grain and a half of opium were ordered at bed-time.

During the next three days there was no alteration in the symptoms, but he appeared more cheerful.

The calomel and opium were repeated on the 8th.

11. Complained to-day of more pain in the cardiac region. There was distinct friction-sound over the lateral surface of the lower lobe of the left lung, and much more distinct crepitation. Pulse very small and weak.

He was purged and a blister applied to the side.

He was relieved by the blister, and on the 13th, the friction-sound had ceased.

15. The action of the heart became more turbulent, and the first sound was accompanied by a soft murmur. Impulse scarcely perceptible. Dulness on percussion, and increased resonance of voice over lower lobe of left lung.

Ten grains of calomel were given, and repeated on the 16th and 17th.

18. Cough began to be rather troublesome, and he complained of great debility and faintishness.

Two grains of calomel with antimony were given three times a-day, and an anodyne at bed-time.

The expectoration was viscid, tough mucus at first; but on the 21st he spat about half a pint of excessively fetid muco-purulent matter, under a violent access of coughing. His breath was fetid for a few hours, but then became natural.

Calomel and antimony continued.

Dulness on percussion continued, and there was loud mucous rattle immediately to the left of the heart.

24. Mouth became slightly sore, and the calomel was omitted.

25. He had an acute attack of dyspnœa, and pain in the left side, with faintishness. There was loud mucous rale to left of left nipple, and much gurgling between the base of left scapula and the spine. The dulness on percussion also extended higher up the chest.

26. Cannot lie on the right side. Has occasional attacks of dyspnœa; cannot bear to move.

28. Rather easier; only complains of faintishness. The whole of the left side now dull on percussion. To-day the expectoration again became excessively fetid, and his breath diffused a cadaverous odour over the whole ward.

December 1. Fetid muco-purulent expectoration continues; has occasional attacks of dyspnœa and faintishness; always lies on left side, with the shoulders a little raised.

A little infusion was ordered with aromatic spirits of ammonia. The anodyne at bed-time continued.

5. Fetid viscid expectoration continues. His breath has a cold earthy smell. All the intercostal spaces, from the sixth upwards, are quite on a level with the ribs. The gurgling continues in the inter-scapular region, and mucous rattles in lower lobe of left

lung, anteriorly. Action of heart much oppressed, and with a soft bruit accompanying first sound. Pulse very feeble and irregular.

He was ordered wine, and the anodyne at bed-time continued.

He gradually became more emaciated; but no change took place until the 13th, (when he spat four or five ounces of dark fetid blood,) except that there was very considerable fulness over the superior intercostal spaces of left side, and considerable tension, which was relieved by division of the integuments.

He continued to spit dark fetid blood with sero-purulent grumous matter, excessively disagreeable; the breath was cold and cadaverous; pulse scarcely perceptible. He became gradually exhausted, and died on the 17th.

He had taken port wine at intervals, with chicken broth, acid drinks, and an occasional anodyne.

Autopsy eight hours after death. Right lung and pleura healthy. The whole of the upper part of the chest on the left side formed an immense cavity, containing between two and three pints of a dirty and extremely fetid serum. The upper lobe of the lung on this side was completely flattened into a mere layer of fleshy substance, resting upon the spine. The lower lobe was adherent throughout, preventing the gravitation of the fluid below the sixth rib. The lobe itself, as well as the pleura connecting it with the ribs, was in a state of grangrene. There was an effusion of recent lymph upon the surfaces of the pericardium, and the apex of the heart was adherent to the reflected layer. The gangrenous abscess of the lung communicated with the upper part of the pleural cavity immediately behind the heart, through a large opening where the *pleura pulmonalis* had given way. The cellular tissue of the left submaxillary and axillary region was permeated by a fetid dark-coloured serum. All that part of the pleura forming the walls of the empyema was covered by several layers of dark-coloured adherent lymph.

Remarks.—Tapping was proposed in this case, but it appeared so clear from the physical signs that the empyema depended upon gangrene of the lung, that it was not performed.

Among the few cases of acute pleuritis that have occurred during the year, one only demands particular notice.

Thomas Ashman, aged 30, H. M. S. Prometheus, 18th June 1842, stoker, was placed on the sick list on the 12th of May with symptoms of acute pleuritis, which were relieved by bleeding, tartarized antimony, and counter-irritation; but pain and severe cough remained, with tenderness in the hypochondrium, and irritability of stomach.

June 18. On admission he was pale, and in some degree emaciated; the surface covered with profuse clammy perspirations; the countenance anxious, and slightly collapsed. His easiest position is sitting in bed leaning forward; sleep much disturbed by cough; respiration hurried; voice interrupted and low; expectoration very

copious and frothy. He could not bear the slightest percussion over the right side. There was a peculiar thrill or fremissement over this side, and no respiratory murmur could be heard below the third rib. The action of the heart was turbulent, but the sound healthy, except a flapping noise in the situation of the mitral valves. Acute tenderness in epigastrium and right hypochondrium; great thirst; white furred tongue; bowels open; scanty high-coloured urine, depositing much mucus. Low diet; ten grains of calomel at bed-time were ordered.

19. Much the same. *Ol. Ricini*, ℥i.

20. Cough excessively troublesome, other symptoms the same.

Antim. Pot. Tart. gr. ss. *3tia quoque hora sumend. Haustus emeticus.*

21. Considerable dyspnœa. In the evening the pain in the chest became much more acute, with dry hot skin, and hard bounding pulse.

He was bled to fourteen ounces with much relief.

The blood was highly buffed and cupped.

22. Extreme tenderness continues on right side of chest, and very troublesome cough.

Continue tartarized antimony.

23. Stomach became very irritable. At bed-time he took the pill of calomel and opium; slept well, and on the morning of the 24th said he felt much better.

Two grains of calomel, with antimony, ordered night and morning, and the tartarized antimony continued.

25. Stomach became excessively irritable; cough and pain continued; there was a loud gurgling in right infra-mammary region, with fremissement. He could not bear percussion. There was large crepitation throughout left lung, principally heard during expiration, which sound was much prolonged.

Haust. Anodyn., h. s. s.

During the next three days the symptoms increased in severity, and perspiration became excessive and very acid.

29. The action of heart was more turbulent. Pulse rather wiry.

Tinct. Digitalis, m. x; *Mist. Camph.* ℥i; *M. Ter in dies sumend.*

30. Vomiting was almost incessant.

Haustus effervescens.

July 1. Hydrocyanic acid was given with effervescing draughts to relieve the vomiting, without effect, and he died in the evening completely worn out.

Inspection fourteen hours after death disclosed the following appearances:—The right lung was almost wholly obliterated by compression, and the pleura on that side formed an immense cavity, containing about three pints of greenish turbid serum. The pleura was covered by several layers of partially organized and slightly adherent lymph. No bronchial communication detected by the blow-pipe. Left lung œdematous throughout, with patches of emphysema at the edges. Small vegetations on the mitral valves; heart otherwise healthy. Slight injection of mucous membrane of stomach, which was covered by viscid mu-

cus. Liver enlarged, softened, and friable. Both kidneys very large and congested.

Empyema; displacement of heart; recovery without operation.—James Macritchie, aged 20, H. M. S. Indus, 26th July 1842, of a scrofulous habit, entered the service in October last, having been previously employed in a cloth factory, and enjoyed tolerable health. He was received from H. M. S. Ceylon, June 16, with symptoms of subacute pleuritis, and discharged, July 5, apparently well. He remained so until the 14th of July, when he was sent on board the Indus, caught a fresh cold, and was placed on the sick list on the 17th with cough, pain in the chest, and extreme debility. This continued, and on admission here, 26th, he was pale and emaciated, the surface cool, the countenance anxious and contracted, and the position always on left side,—being unable to lie on right side or on back. The intercostal spaces on the left side quite on a level with the ribs. The heart was acting to the right of the sternum, the apex impinging just below and to the left of the right nipple,—both sounds being exceedingly sharp, and the action rather tumultuous. Pulse 110, small. Extreme dulness on percussion over every part of chest, except the right side, laterally and posteriorly, and the respiratory murmur only audible distinctly in lower lobe of right lung. From this it was evident that a large effusion in the left pleura had caused collapse of left lung, and displacement of heart; and that the upper part of the right lung was much impeded in its action by the position of the heart.

Tinct. Scillæ, ʒss.; *Tinct. Digitalis*, M. x.; *Aq. Cinnamon.* ℥ss. M.; *f. Haust. ter in dies sd.*

This he continued with scarcely any intermission until August 30.

27. Appears lower. Has been lying all day on the left side, breathing very rapidly. Pulse extremely rapid and feeble. Heart appears a little higher in left side than yesterday.

30. Urinates freely. No other change, except that there is a very peculiar sound produced by the irregular entrance of air into the right lung. It appears as if the heart, during its diastole, mechanically prevented the entrance or exit of air, and then a rush took place during the systole. On measurement, from the spine to the sternum, the right was an inch and a half larger than the left side.

Ten grains of calomel were given at the hour of rest.

He continued much in the same state, except that he breathed with less effort; but became more emaciated until the 20th of August, when the respiration was found to be much more healthy than before in the right lung, and the heart has sunk lower and rather more to the left side, the apex reaching the right border of the sternum.

August 27. During the last week the heart has gradually and steadily returned to its normal position. Puerile respiration in right lung bronchial towards the summit. Percussion below the

heart on the left side gives an abnormally clear sound, apparently from flatus in the stomach; both above and posteriorly it is quite dull, and no respiratory murmur can be heard.

A purgative has been occasionally given, and counter-irritation employed over the side.

September 10. Intercostal spaces have become visible again; general health improving.

20. He is beginning to walk about.

December 31. He is in tolerable health; but is subject to palpitation on any exertion. The heart is in its normal position, but the left side of the chest is much contracted, and scarcely any air enters the lung. The only spot where the respiratory murmur is audible, is in the interscapular region. The side is universally dull on percussion.

Passing to diseases of the heart, we first notice those of the pericardium. There have been only three cases of acute pericarditis during this year, and all these were connected directly or indirectly with rheumatism. One of these occurred in a boy named Boulger, and another in a midshipman: both were treated by general bleeding and cupping, calomel and opium, and counter-irritation, the latter with complete, the former with only partial success, as adhesions of the membrane had evidently formed. The other case was a very remarkable one.

Pericarditis, with effusion of three pounds and a quarter of purulent matter.—J. Watts, H.M.S. Queen, 17th September 1842, marine, aged 22, two years ago, had rheumatism, and suffered at the time from cardiac symptoms. September 14, he was put on the sick list, complaining of headach, which continued during the next day, and was accompanied by pain in the epigastrium. At 3 A. M. of the 17th, he complained of severe pain in the left breast, with dyspnœa. At 8 he felt violent palpitation, which continued, and he was sent to hospital in the afternoon. The circulation appeared much oppressed; extremities cold; lips bluish; and laboured respiration. Warmth was applied to the feet, and a mild stimulus given, and he remained better for a few hours; but at 2 A. M. of the 18th I was called to him and found him almost dead; the surface was cold and bluish, especially the extremities; countenance cadaverous, lips blue; conjunctivæ glassy and dark in colour. He lay on his back, a little inclined to the right side; was quite rational, and did not complain of pain. The slightest motion excites violent action of the heart; dry, loud, almost bronchial respiration in both lungs,—heavy and interrupted with occasional sibilus or rhonchus in upper lobe of left; inspirations frequent, deep-drawn, in a sighing manner, and accompanied by an occasional hiccup; scanty expectoration of tough mucus; cough not very frequent, but causes extreme distress by producing pain in the cardiac region. When he coughs, he holds his chest firmly with his hands to prevent shaking of the ribs. Percussion shows dulness over cardiac

region to a greater extent than natural; action of heart exceedingly tumultuous; impulse and sounds both increased in intensity; there is a double bruit over aortic orifice, extending along the course of the aorta, with a loud regurgitant flap of the valves. Pulse scarcely perceptible. Considerable tenderness on pressing upwards under false ribs towards heart.

The case appeared to be one of old adhesions of the pericardium, with a recent attack of inflammation, accompanied by effusion. The return of blood from the lungs was evidently obstructed, and imperfectly arterialized blood circulated through the body. It also appeared extremely probable that the stagnation of the blood in the heart had led to the formation of coagula, extending into the aorta. However this might be, it was plain that the only way of relieving the symptoms was by removing the obstruction to the circulation on which they depended, and he was accordingly placed erect, and bled until he felt faintish. Eight ounces of blood flowed, and he felt much relieved, although the pulse did not rise.

Four A. M. Has slept since the bleeding, and feels easier.

Nine A. M. Action of heart but little altered, but he appears more cheerful, and less blue; still the same dry, harsh, respiratory murmur, but less obstructed in the left lung than before. In the afternoon acute pain came on in the left ileo-lumbar region. Three copious enemata of warm water were given, which brought away free soft dejections. Showed a great disposition to sink during the night, and it was twice necessary to give him small quantities of wine.

Two grains of calomel and two of antimonial powder were ordered to be taken three times daily.

19. Dulness more extensive in cardiac region, but says he feels better. Abdominal pain was relieved by fomentations. Lungs played more freely.

20. At two A. M. complained of violent pain beneath right false ribs. Pulse still very indistinct, but skin hot.

Hirudines xx; *fomentatio.*

Pain continued but much less severe, and an indistinct frothement was heard in the painful part. Dulness in left side extending. Action of heart less tumultuous.

21. Action of heart much more tranquil; no bruit audible; pulse 100, very small and soft; pain in right side continues; slight dulness on percussion, between right clavicle and second rib. Respiration very heavy throughout the lung, and just over diaphragm a rough loud friction-sound, as though there were albuminous effusion between the pleura, over the lower lobe of the lung and its opposed surface.

22. This rough friction-sound has changed into a sort of large crackling crepitus. No respiratory murmur is heard, but an occasional gush of air appears to penetrate the lower lobe of the lung. Dulness on this side, nearly as high as the nipple. He now lies on his left side, and dulness on percussion has extended almost all over this side; the respiration is very heavy; action of heart less turbulent, but both sounds are accompanied by a bruit, that with the first being the louder and more prolonged.

All these symptoms continued without any material alteration, (except that the dulness both on right and left side continued to become more marked, and the respiration more laboured,) when at one A. M. on the 30th, he suddenly sat up in bed, appeared greatly distressed by a feeling of suffocation, and died.

Autopsy nine hours after death. On opening the chest enormous distension of the pericardium became visible, and in its cavity there was a collection of purulent matter and flocculi of lymph, adherent and non-adherent, which weighed three pounds and a quarter. Near the apex there was an old adhesion, with white opacity of the pericardium. The whole membrane (both visceral and reflected layers) was covered by a layer of recently effused and partially organized lymph, the evident result of an acute attack of inflammation, and from the surface of which the purulent matter had, in all probability, been secreted.

Right pleura was adherent superiorly; inferiorly, where it is reflected over the lobe of the lung, the diaphragm, and the thoracic parietes, it was covered by several layers of lymph, which, between the opposed surfaces, formed a large coarse net-work, the cells of which were filled by a semigelatinous fluid. Both lungs and the liver were much congested. The peritoneum covering the diaphragm and the parietes of the abdomen under the false ribs was opaque, but had no other appearance of disease. Incipient granular disease of both kidneys.

Remarks.—This case is not only interesting as an example of a morbid change seldom observed, purulent matter in the pericardium, but is useful in showing how greatly mechanical obstacles to the circulation about the heart may modify the pulse. Thus, under the most acute pleuritis there was a small, soft, scarcely perceptible pulse, and this, with the most turbulent action of the heart.

Of the diseases of the muscular tissue and valves of the heart, it is needless to speak, as we have had no opportunity of verifying the physical diagnosis in the dead house. There have been three cases of aneurism of the thoracic aorta, two found after death only, and one observed during life. In the two former cases the disease had not manifested itself by any symptoms, the men doing their duty until the last moment. One man died suddenly under the excitement induced by a blow, and in this case the aneurism had opened into the left bronchus. The other suddenly fell dead on the forecastle while employed in his usual avocations; and the pericardium was found distended with blood, the aneurismal sac having given way just where the pericardium is reflected from the anterior surface of the aorta. The preparation of the former has been, and that of the latter will be, sent to the museum of Haslar Hospital. The third case was observed here, and the man invalided, but died at Haslar Hospital, when the diagnosis made here was verified. This was the case of

Henry Coleman, aged 31, H. M. S. Magicienne, 14th January 1842, a marine, twelve months before admission felt numbness in the left arm, which frequently returned, and after about six months was accompanied by palpitation. He was put on the sick list 5th December 1841 with oppression and pain in the cardiac region, increased on any exertion, with short respiration, and much pain down left arm to thumb and forefinger. Violent arterial action all over the body. Pulse 116. He had been on the list two months before with similar symptoms, which were removed by bleeding, antimonials and counter-irritation. Eleven years ago he was invalided for disease of the chest, but had not had palpitation. The bleeding was repeated the last time he was put on the list, cupping employed, and he took blue pill with squills and digitalis.

On admission he appeared pale and somewhat emaciated; the state of surface natural; lying on the left side immediately induced a palpitation and dyspnœa. He could lie on back or right side when awake; if on back when asleep it brought on frightful nightmare. Sleeps well; state of mind composed; no pain in head, but feels giddy when erect. The voice occasionally varies in tone, and on questioning, recollects that he found it altered soon after he felt numbness in the arm, and before he had any palpitation. No cough or expectoration. Slight dulness on percussion under left sterno-clavicular articulation; chest otherwise sounds well. The circulation is greatly excited on any exertion, and the respiration much oppressed. Impulse of heart stronger than natural; there is a loud click with the first sound, and a very loud *bruit de soufflet* with the second sound, extending along the course of the aorta. Pulsh 90, jerking, not very hard. He says he "feels a kind of heaviness and throbbing, as if something were hanging" just at the top of the sternum. No pain or tenderness in abdomen; but considerable pulsation in the aorta and audible bruit. Digestive functions well performed.

17. Has become quieter. Pulse 80.

19. Discovered a second centre of pulsation in the chest with a double bruit, just to the left and below the left sterno-clavicular articulation. Pulsations of radial artery stronger in right side than in left.

21. Complained of occasional spasmodic action of heart. Otherwise better. Bruit very audible in interscapular region.

31. Respiratory murmur much stronger in right lung than in left.

February 5. No change.

15. General health improving. No change in the physical signs. Was discharged for a passage to England.

Although the second centre of pulsation in the chest could only be detected by the stethoscope, and then not very distinctly, the symptoms of this case so clearly showed pressure upon the air passages and upon the left subclavian artery, that, with the history of the symptoms, left no doubt as to the nature of the disease. The man died in Haslar Hospital, and an aneurism was discovered. But my informant did not recollect its precise situa-

tion. During the time he was here the treatment was simply palliative.

The only cases of injury of the chest affecting the organs of respiration have been two of fractured ribs, in which inflammatory symptoms were readily combated by bleeding, followed by calomel and opium.

Passing from the diseases of the respiratory to those of the digestive organs, I shall first notice the only case of hepatic abscess we have had during the year, because it produced physical signs which led to a suspicion of disease in the lung or pleura.

John Brown, aged 32, H. M. S. Magicienne, marine, was placed on the sick list on the 23d of July with general lassitude and headach, pains in the loins, shoulders, and thighs. Pulse full, firm, and frequent; respiration hurried; and he had a severe rigor followed by heat of skin and perspiration. On the 1st of August he became low, the pulse rapid and feeble, skin cool and clammy. He had been bled and treated with mercurials, antimonials, and purgatives. Ammonia and camphor were then given, and the ship going to sea, he was sent to the Lazaretto, August 3. The quarantine expired on the 6th, and on his admission on that day he was considerably emaciated. The surface was pale and covered by a cool clammy sweat; countenance anxious; position on back; appears half stupid, but is quite rational when roused; all the senses dull; respiration rather hurried; voice low; cough rather troublesome, with copious mucous expectoration; complete dulness on percussion on right side as high as nipple; no resonance of voice; respiratory murmur inaudible in the same situation, in the upper lobe, accompanied by mucous rattles; mucous rattles in left lung; sounds and action of heart healthy; pulse 110, feeble; no pain or tenderness of abdomen, and sign of enlargement of liver on percussion or pressure; tongue covered with dark fur, and teeth with sordes; evacuations rather loose, but showed no deficiency of bile. From the above symptoms it appeared probable that the case was one of solidified lung or circumscribed empyema, and the voice being so low that no opinion could be formed upon its non-resonance, nothing conclusive appeared in favour of either view.

7. No change during the day. Became slightly delirious in the evening.

8. Continued to sink.

9. Respiration very laborious. Was called to him in the night and found him sinking, with cold extremities, almost imperceptible pulse, and bronchial rattles, and he shortly after died.

Inspection six hours after death disclosed the following appearances.

The right side of the thorax, as high as the fourth rib, was encroached upon by the liver. No adhesions between the *pleura pulmonalis* and *costalis* had taken place, but the lower lobe of the lung was adherent to the diaphragm, and was much condensed by the pressure of the liver. The upper lobe was much congested, and

there was about a pint of fluid in the pleural cavity. Left pleura adherent throughout, but the lung quite healthy, except that it was slightly emphysematous on the surface. About an ounce of serum in the pericardium. Heart healthy.

The right lobe of the liver was the seat of an enormous abscess, which contained upwards of a pint of purulent matter. The abscess was circumscribed by condensed parenchymatous tissue infiltrated with purulent matter, with shreds of sloughing liver adhering to it. In the left lobe there was also a smaller collection of purulent matter contained in a well-formed cyst, about the size of an apple. The whole of the liver appeared to have been the seat of disease, as the parts in which purulent matter had not been fully formed, presented, on section, a number of irregular yellow patches, evidently the acini enlarged from accumulation of purulent matter. The tissue was very soft and friable, breaking down under the finger. Slight injection of small intestines. Homogeneous deposit in both kidneys. Other abdominal organs healthy.

The simple diseases of the intestines during the year have been diarrhœa, (which was treated in the usual manner,) and one case of *colica pictonum*, in which the blue gum was very marked, and which yielded to alum and sulphuric acid, after the more usual means of producing purging had failed. There have been several cases both of hæmorrhoids and fistula, but nothing worthy of particular notice. The more serious diseases of the intestines will fall under the head of dysentery and fever, when speaking of specific diseases.

We pass then to diseases of the kidney, and it will be seen that three men have died and nine have been invalided for renal disease. Besides this, in 48 *post mortem* examinations, the kidneys were found healthy in 16 only, in the other 32 being more or less affected in common with other parts. It is plain, therefore, that renal disease forms a very large proportion of the sickness of seamen and marines in this climate; and from the examination of about fifty bodies which I have attended during the year in Valetta, I am inclined to believe that it is much more common with them than among the Maltese. The morbid changes are in many respects the same as those described by Dr Bright in his various stages of granular disease. But if, as he considers, albuminous urine be an almost universal concomitant with his disease, then there must be some important difference between the disease observed here and "Bright's Kidney;" for in the 32 cases mentioned above, the urine was albuminous in four only. The various changes observed after death appear to be more or less advanced stages of the same morbid process.

The first indication of departure from the healthy state appears to be either extreme vascular congestion, (which was found in a man named Whinyates, who died with acute anasarca and cerebral symptoms,) or a simple softening of the kidney, which is larger than natural and flabby to the touch; such a state as is

observed in typhoid fevers and diseases in which the blood is unnaturally fluid. In some cases this softness was so great that it appeared almost like commencing decomposition; but the period at which the bodies were examined after death, and the absence of any trace of decomposition in other parts, proves that this is not the case. In these cases of softening the colour has always been deeply red.

It will be seen that I have occasionally spoken of homogeneous deposit in the kidneys. This term is merely used for want of a better to describe an appearance when, on dividing the kidney longitudinally into two symmetrical portions, the distinction between the medullary and cortical portions is lost. This is only completely the case in a very advanced stage of disease; in the early stage the cortical portion appears paler than natural, and very frequently it is streaked by bright red striæ, giving an appearance as if a fine saw-dust coloured albumen had been diffused through its tissue, leaving a series of small arteries without obstruction. A little later the cortical substance becomes thicker, more visible between the tubular cones, the red appearance of the vessels just described is lost, and it appears as if the deposit had become uniform; its outer surface is also more speckly. As the disease advances the cortical substance continues to encroach upon the tubular or medullary portion, either by enlargement of the processes of the cortex, which pass between the tubular cones, pushing the latter aside, or, as it were, compressing them, or by completely taking their place, so that they are no longer visible. Sometimes three or four of the cones are entirely absent, their situation being taken up by the abnormal cortical substance; at others half or a third part will remain, as if the process of replacement were but half-completed and was advancing, the line of demarcation being very distinct from the pale colour of the encroaching portion. On squeezing such kidneys in a cloth a considerable quantity of blood often exudes, and then the cut surface appears as if worm-eaten, from the number of mouths of small patent vessels which are visible.

In two cases I have found the blood in the emulgent vein coagulated and containing fibrinous coagula. All this exists without the granular or mottled appearance of the surface after stripping off the peritoneal coat, as described by Dr Bright. I do not wish, until I have made further microscopical observations on the disease in its various stages, to discuss its pathology. But may observe that it would appear to be analogous to tubercle—viz. a deposit of low vitality from the blood-vessels of an organ, upon or within the minute extremities of its excretory duct. As in the lungs tubercle is deposited in the minute air vesicles, (the extremities of the trachea,) from the vessels ramifying over them; so, in the kidneys, this albumino-fibrinous deposit passes from the ramifications of the renal blood-vessels into the *tubuli uriniferi*, the extremities of the ureters.

Of the fatal cases of renal disease, we have alluded to that of Whinyates, aged 40. Another man named Lacey, aged 25, whose kidneys were in an advanced stage of the granular degeneration of Dr Bright, died with coma and strabismus, depending secondarily upon cerebral effusion. This man's urine was not examined during life; that in the bladder after death was not albuminous. The third case was a man named Wallace, aged 35, whose urine was albuminous, and whose most prominent symptom was obstinate unallayable vomiting. In this case the disease was also far advanced.

I hope to be able in future to connect the state of the urine during life with the morbid appearances observed after death.

There have been several cases of stricture of the urethra during the year, but none calling for particular notice except one, in which the urethra had given way behind the stricture the day before admission, and extensive extravasation of urine had taken place. Free incisions of the perineum were practised, and the constitution well supported, and he ultimately did well.

There have also been several cases of hydrocele. Acupuncture has generally answered extremely well. The port wine injection has been used in three cases; in two with complete success. In the third there was some chronic disease of the testicle—apparently hydatid—and the man was invalided.

We pass to the diseases and injuries of the organs of locomotion, and of the diseases that have nothing of interest to notice. Among the injuries, fractures are the most important, and they have occurred in the following proportion, exclusive of those at present in hospital.

Two fractures of the *ossa nasi*, both cured.

Three fractures of the lower jaw, all cured.

One fracture of the ribs, cured.

Two fractures of the scapula, one cured and one convalescent; the acromion being broken in one, the posterior angle in the other.

Two fractures of the clavicle, both cured.

One fracture of humerus, comminuted, cured.

Three fractures of radius and ulna, two cured; in one the crest of left ilium being also fractured; one invalided. The fracture had entered the elbow-joint and ankylosis followed.

Five compound fractures about the hand, all cured by amputation of fingers or metacarpal bones.

Three fractures of the femur, all cured; in one the lower-jaw being also broken.

Two simple and one compound fracture of tibia, all invalided from more or less subsequent lameness.

Two fractures of the fibula, both cured,

One compound fracture of fifth metatarsal bone, cured.

One compound fracture of fourth and fifth metatarsal bone, cured by amputation of the heads of the injured bones.

Among those at present in hospital is a case of compound fracture of the ankle-joint, and one compound and one simple fracture of the tibia; and one simple fracture of femur, all convalescent. The starch bandage has been frequently used with excellent effect.

There have been but three cases of dislocation; one of the knee-joint, and two of the clavicle, all of interest.

Richard Grace, H. M. S. Howe, aged 22, seaman. While undergoing the punishment of running up and down the rigging, he fell from the main topmast head to the main topmast rigging and into main top, from thence into the main rigging and main chains, and was jerked overboard. There was injury of left knee-joint, laceration of right foot, and contusion of right buttock. He was immediately sent to hospital, and, on admission, there was visible deformity of the knee, which was much increased by raising the foot. On placing the hand in the ham and raising the foot, the head of the tibia was immediately felt to be thrown backwards upon the hand. The deformity thus produced was immediately removed by straightening the leg. There was no fracture of fibula, patella, or condyles of femur, but it appeared probable that there was extensive laceration of the ligament of Winslow. Considerable swelling came on in an hour or two, and he continued pale, cold, and much depressed. The leg was laid upon pillows, and a dose of opium and ammonia given.

12. Constant twitchings of the *vastus internus* and adductors came on. He was less depressed. Thigh supported by a bandage.

13. Limb supported by pillow and bandage. Cold lotions applied.

20. Has continued to improve. Still some swelling and considerable ecchymosis, but no bad symptoms.

February 5. Has not had a bad symptom. Can bend the leg well and extend it pretty tolerably.

Continued well, and was discharged cured on the 22d.

The two cases of dislocation of the clavicle were displacements of its acromial extremity, in the one case upwards, and in the other downwards and inwards. The former was treated with a figure of 8 bandage and did very well. The latter was in a man named Fleming, who received a blow upon the point of the shoulder, and, on admission, it was evident that the clavicle had been displaced downwards and inwards from its acromial attachment, the extremity of the bone lying upwards of an inch beneath the acromion, under the border of the Trapezius. When the arm was left without support the acromial end projected extremely, and its exact form was exactly seen beneath the integuments. The arm being lifted upwards, and the shoulder inclined backwards, the clavicle was grasped and pulled outwards and upwards towards its normal position, a pad was

placed in the axilla, another upon the acromion, and the arm kept firmly to the side after the application of the figure of 8 bandage. He had not a bad symptom, and was discharged after forty-seven days, some slight deformity of the shoulder remaining from projection of the acromion; but the motion of the joint was very free, and he said he was perfectly able to do his duty.

Before leaving the injuries of the joints it is necessary to refer to a case of punctured wound of the knee-joint.

James Harris, H. M. S. Alecto, aged 30, stoker. On the evening of the 29th of January he fell from the paddle-box upon a nail which entered the knee-joint. No bad symptom came on until the next day, when there was considerable pain, swelling, and discharge of synovia. On admission, the wound appeared scarcely larger than a pin's head, just at the outer and lower edge of the left patella, and synovia was issuing from it very freely. The joint was considerably enlarged, both from effusion within and tumefaction around it. Surface very red, but no great pain on pressure. The joint was immediately covered with leeches, and a poultice afterwards applied.

February 1. A great deal of synovia has been discharged during the night. The wound was slightly enlarged. Cold lotions applied, and he took tartarized antimony every three hours, and a mercurial purgative.

3. Leeches again applied on account of a slight increase of pain and redness.

5. Still considerable pain, but scarcely any escape of synovia or redness. He has never had any constitutional symptoms.

13. Has gone on with some slight pain, stiffness, and swelling of the joint. Since the 10th the *Ung. Ant. Tart.* has been applied.

18. Has not any pain in the joint except when he stands, and then very slight.

26. Discharged cured.

He is at present in the hospital with syphilis; but the knee-joint has continued quite well, and has never given him the slightest uneasiness, although he has been doing duty for the last nine months.

It will be seen that 127 patients have been in the hospital during the year, with diseases of the integuments or fibrous tissues. Of these a considerable number were ulcers, arising independent of injury, and almost all the remainder cases of rheumatism. Cases of acute rheumatism have been rare; in the two best marked cases pericarditis came on. The great majority have been chronic cases, and in these, pericardial complications have been much more rarely met with than in England. The symptoms have been simply those known as lumbago, sciatica, and pain and stiffness of different joints, with more or less thickening of the fibrous tissues around them, and a corresponding degree of loss of motion. The

following table will give a tolerably correct view of the treatment that has been adopted, with its results. I cannot find that the iodide of potassium has been much tried in the rheumatism of this climate, but Dr Martin has expressed his intention of fairly testing its efficacy. Fifty cases have been discharged cured during the year; 17 in the quarter ending 31st of March; 17 in that ending 30th June; 10 in that ending 30th September; and 6 in that ending 31st December. The table shows the treatment adopted, the number of cases in each quarter in which it was practised, and the average number of days the patients remained in hospital.

Treatment.	Lady Quarter.		Midsum. Quar.		Michael. Quar.		Christmas Quar.	
	No. of cases treated.	Av. No of days in hos.	No. of cases.	Days in hospital.	No. of cases.	Days in hospital.	No. of cases.	Days in hospital.
Colchicum with sulphate of magnesia,	5	32	7	33	4	20	3	30
The above with mercury,	3	64	6	64	—	—	—	—
The above with opium added to mercury,	—	—	—	—	4	93	—	—
Mercury alone,	5	52	1	99	—	—	—	—
Mercury with opium and purgatives,	4	46	—	—	2	67	—	—
Mercury with tartar emetic,	—	—	3	92	—	—	—	—
Warm baths,	—	—	—	—	—	—	1	168
Iodide of potassium,	—	—	—	—	—	—	1	33
No medicine. Simple atten. to diet & regi.	—	—	—	—	—	—	1	14

It would appear, therefore, that mercury has had a fair trial, and, whether simply or in combination with opium or other medicines, the results have not been favourable. The combination of the *Vinum Colchici* in doses of ʒss., combined with ʒss. to ʒi. of the sulphate of magnesia, has been of very considerable service.

Of the ulcers, the only cases of interest were received from the Indus in the months of July and October. They had all a peculiar character, and, therefore, appeared to depend upon some cause within the ship, as in no other ship in the squadron were similar ulcers observed. They were circular ulcers, with raised fiery red, and often inverted edges, generally commencing as a boil, which broke and left a dirty fetid black sloughy base. If a poultice were applied, instead of promoting the separation of the slough, the ulcer rapidly increased in size, and there was a profuse sanious discharge; for some little distance around the circumference there was generally an erysipelatous blush. The constitutional disturbance was not generally great, but in several cases a pustular eruption appeared in the legs, and in two on the body also, similar in appearance to that produced by tartarized antimony. Clear contagion was establish-

ed between these ulcers, as a boy named Henry, who had a simple sore on the ankle nearly cicatrized; a man, Dowling, in whom the wound of a compound fracture of the ankle-joint was nearly healed; and Warne, who was just recovering from diffuse inflammation of the cellular tissue of the leg and thigh, all on the same morning took on the peculiar character of the "Indus" ulcer, after having, contrary to express orders, remained the day before in conversation with a man, Denham, who had been just admitted with one of these ulcers in its worst form. Dowling and Henry ultimately did well; but in Warne the old cicatrices rapidly re-opened, and in course of about a fortnight the knee-joint, which had been completely surrounded by ulceration, became opened, and so much constitutional disturbance followed the synovitis, that amputation became necessary. It was performed above the knee by the flap operation, and he is now well with an excellent stump. The case of Denham was a most obstinate one, the whole leg forming one immense ulcer, with a sloughy base, and the tibia and fibula, which were both exposed, throwing off black exfoliations. He was well supported by wine and quinine, long granulations shot up, the sloughy surface became a healthy granulating one, and cicatrization is now almost complete. With regard to treatment, a tonic plan was pursued generally, and locally the black wash appeared to be the most useful stimulant; after the surface became clean simple water dressing was the most successful application. The only other amputation that has been performed during the year was on account of an extensive ulcer of the leg, which was followed by periostitis, and synovitis of the knee-joint, with ulceration of the cartilages. He was in a state of extreme emaciation, but stood the operation well,—circular above the knee. Some exfoliation of bone took place, but he rapidly recovered, with a good stump.

The accidental injuries not alluded to under injuries of the head, or fracture and dislocation, have been too slight to call for notice, and we pass to

Specific Diseases, under which class are grouped a number of diseases, in which a uniformity of symptoms, progress, and termination implies a similar, or specific cause. Of such diseases during the year there have been 146, namely, syphilis, 56; gonorrhœa, 12; variola, 6; typhus, 45; erysipelas, 8; *febris palustris remittens*, 13; *febris palustris intermittens*, 4; *dysenteria palustris*, 2. Of the cases of syphilis, mercury was used to slight salivation in the primary cases; and in the secondary ones the iodide of potassium alone, or combined with sarsaparilla, has been most useful. The dose usually employed, and

that most generally useful, has been eight grains three times a-day.

Of the six cases of variola, five recovered without any peculiar symptom; one, an officer, (Mr Glen,) died; and there were well-marked variolous pustules, and deep ulcerations in the mucous membrane of the larynx, and in the anal portion of the rectum.

Of the cases marked typhus the majority have been what Cullen would have called Synochus. They are classed together here, because it is often very difficult to say where what is called continued fever ends and typhus begins. They run imperceptibly into each other, and probably should be regarded as different degrees or stages of the same disease. There have been six deaths, exclusive of two in which it was doubtful whether acute pneumonia was a primary or consecutive lesion. The symptoms were those of typhoid pneumonia, and in both there was extensive gray hepatization of the right lung. In the six cases just mentioned, the blood was more or less fluid, in some perfectly uncoagulable and clarety. There was also uniformly more or less disease of the intestinal glands, and the amount of disease did not seem to be proportioned to the duration of the fever. The lowest part of the ileum, immediately above the ileo-colic valve, was always the seat of the greatest amount of disease. In a boy named Coffin, who died in four days after the first symptoms of fever, this disease of the glands of the ileum was further advanced than in any other. In this case the thickening of the coats of the intestine, owing to enlargement of and deposition into the glands, was so great as nearly to close the canal;—a quill would scarcely pass. In a boy, aged 18, named Hexham, who died on the fifth day; in a man, Griffin, aged 40, who died on the twentieth day; in a man, Wheatley, aged 27, who died on the fourth day; in Clark, aged 19, who died on the seventh day, the state of intestine was very similar. In all, there was more or less injection of the mucous membrane; Brunner's glands had the appearance of small pimples, or grains of mustard seed; the intestines were transparent from distension with gas, showing a number of irregular patches of opacity, which proved to depend upon the deposit of a grayish friable matter in the glands of the submucous tissue; the *glandulæ aggregatæ* and *solitariæ* showed the usual effects of acute inflammation in their structures, and the mucous membrane covering many of them had given way, leaving an inflamed elevated border surrounding a yellowish-green cheesy-looking slough. The large intestines were generally much injected, and in some ulceration had extended along the cæcum. Small quantities of arachnoid effusion and

considerable pulmonary congestion were also universal. The symptoms presented nothing unusual in cases of typhus, with local complications in the head, chest, and abdomen. The treatment after admission was generally stimulant, as the typhoid state was far advanced before they were sent to hospital.

The thirteen cases of *febris palustris remittens* were received from the Medea after the Xanthus expedition. One only died. There was no ulceration, but considerable injection of the intestines, and the spleen was more than three times its natural size. There was some cerebral effusion, and the blood had gravitated to all the depending parts of the body. It was perfectly fluid, and the proportion of fibrin rather less than 2 parts in 1000. The most severe case which recovered, Mr Webb, the assistant surgeon, was remarkable from the large quantity of brandy which was necessary to keep him alive. He took upwards of half a pint daily, for four days. I do not enter more fully into the cases of fever at present, because I hope, in a subsequent report, to compare the fevers of different seasons, and those arising in different countries, with each other, and give the *post mortem* appearances in correct relation with the duration of the fever.

In the fatal cases of dysentery, extensive ulceration of the mucous membrane of the cæcum and colon, with thickening of the coats of the intestine, were the characteristic morbid changes.

Cases of erysipelas have not been common, but very severe; —two have died. One, Stringer, died on the eighth day, and in him there was extensive gangrene, with infiltration of putrid sero-purulent fluid into the cellular tissue of the thigh, side of abdomen, thorax, and axilla. All the small veins of these parts were plugged with coagulated blood and fibrin, and their coats softened; but no absorption of purulent matter appeared to have taken place. The blood throughout the body was perfectly fluid, and fibrinous coagula had formed in all the large vessels both arterial and venous. The other man, Jamieson, died on the twentieth day, and the whole of the cellular tissue of the right lower extremity was the seat of purulent infiltration, the subjacent muscles being softened and dark-coloured. Shreds of the cellular membrane in a gangrenous state were extensively separated, especially about the calf of the leg. The small superficial veins of the limb were completely obliterated, and no trace of purulent matter could be detected in any of the larger veins of the limb, nor was there any mark of purulent absorption in any organ of the body. Thus, in both these cases absorption of the morbid fluids appears to have

been guarded against, by obliteration of the smaller veins, a highly interesting fact in pathology. In a man named Clark, who recovered after long lingering in a precarious state, there was extensive pulmonary complication, evidenced by loud mucous rales, followed by metallic gargouillements.

I have avoided giving detailed histories of the cases of specific diseases, alluded to in the last few pages, in order that this report might not extend to an unreasonable length; but believe that every case which has occurred during the year, illustrative of any fact in pathology, any means of diagnosis, and any instructive point of treatment, is noticed in its regular order in the report. All morbid preparations of interest have been, or will be sent to the Museum of Haslar Hospital.

Art. VI.—*Case of Death by Asphyxia from a Mechanical Cause.* By Robert Jackson, M. D., Resident Surgeon to the Leith Dispensary, &c. &c. (Read before the Med.-Chir. Society, February 7th 1844.)

On Wednesday morning, 17th January 1844, at 3 o'clock a. m., I was requested to visit H. S., aged 31, a cooper by trade, who was said to be either dead or in a fit. On my arrival at the house, I found the report of his being dead too true. The body was lying on its back in bed, undressed. The countenance was pale, and had a haggard expression, the pupils were dilated, and the surface of the body was somewhat warm. On looking into the mouth, I perceived a small quantity of matter, evidently ejected from the stomach, lying upon the tongue.

Upon inquiry, I was told that he was a man of irregular habits, much addicted to drinking; and the afternoon before his death, his friends had reason to suppose he had been visiting some rectifying establishment, where he had drank a quantity of overproof spirit, which, in their opinion, was the cause of his death. How far this was true will immediately be seen.

On Tuesday, the day preceding his death, he took for dinner a quantity of boiled potatoes with broth, and shortly after left the house. In the evening he was brought home very drunk. About nine o'clock he became sick and vomited a good deal; his mother and brother then put him to bed, which, under like circumstances, they had often done before. His mother awakening from her first sleep, (as she herself said),

and being anxious about him, rose to look at him, when, from his appearance, she became alarmed and sent for medical aid.

From the history of the case, I was led to believe that death had been produced either from excessive intoxication or apoplexy; but, at the same time, I had a suspicion suffocation might have caused it.

On removing the skull cap, the membranes of the brain were found considerably congested, and the substance of the brain itself exhibited numerous red points on a section being made. The sinuses of the *dura mater* were full of blood.

The lungs on both sides were congested with dark-coloured blood; the left was strongly adherent to the *pleura costalis*, and its apex was studded with tubercles, some considerably advancedtowards suppuration.

The left side of the heart was contracted and empty, while the right was dilated and full of dark fluid blood. In short, all the usual appearances of asphyxia were present. Having as yet arrived at no marked cause for such appearances, I looked to the examination of the trachea with some anxiety. On removing that organ from the body, by making an incision above the *os hyoides*, and afterwards running the scissors down the posterior part of the larynx and trachea, the cause of death was at once, and beautifully seen;—a piece of potato skin, of an irregular triangular shape, little more than an inch long, thin as the finest paper, and perfectly transparent, was found lying entangled between the folds of the thyro-arytenoid ligaments, and completely closing the *rima glottidis*. The manner in which it was fixed in this place, and the way in which it must have acted, is curious; one of the ends of the portion of potato skin was fastened over the posterior end of the slit of the rima, while the other two margins were free, forming a kind of valve, and, I have no doubt, acting as one for a time at least, being lifted up at each expiration, and falling back again upon inhalation, and by this means producing death in a short space of time.

It appears probable that the substance in question had been ejected with other matters from the stomach, and had only reached as far as the pharynx, or back part of the mouth, and, from its being of a light nature, had been drawn into the position in which it was found, by the deep and strong inhalations so common in people asleep while intoxicated, and that, from pure want of physical power, the unfortunate man was unable to cough it up.

I shall refrain from further remarks, only observing, that, had the person been found dead in a house of ill fame, had he been quarrelling or disputing, been seen in the company of

suspicious persons, or been at enmity with the inmates of his house, how readily, at least for a time, might suspicion have fallen on innocent individuals, when the cause of death is not quite apparent.

And, lastly, how strongly this case points out the necessity of a strict investigation of all parts of the body in cases of sudden death, and how careful we should be in giving our opinion in medico-legal questions.

Leith Dispensary, 84, Quality Street,
February 1844.

Art. VII.—*Observations on Quotidian Intermittent Fever.* By Thomas Stratton, M. D. Edinburgh, Navy Medical Department, Hon. Memb. Highland Soc. of Canada, &c.

In administering quinine between the paroxysms of intermittent fever, some prefer giving it in repeated small doses, others in one large dose shortly after the previous paroxysm is over, while a third class approve of the same quantity an hour or two before its expected return; the result of the single large dose practice will be mentioned in the following cases, which occurred in my practice during the summer and autumn of 1842 at Port Maitland, on the Grand River, which flows through a swamp* into Lake Erie, where I was in medical charge of H. M. steamer Toronto, and of a part of the first regiment of incorporated militia. The times of accession and termination of the paroxysms are given in round numbers; fits said to commence at nine o'clock, having begun, some of them at nine, and some ten minutes or a quarter of an hour before or after it.

Case I.—Alexander Baillie, private, royal marines, aged 32, has been fourteen months on Lake Erie; never had ague.

September 15. For the last two days he has felt frontal pain and general weakness; but he continued at his duty till to-day, when, at two P. M., he became chilly and shaking. After a time this was succeeded by great heat of skin and severe headach; afterwards by sweating and some abatement of the headach. He had a paroxysm somewhat similar on each of the next three days.

Date. 1842.	Cold stage.			Hot stage.			Sweating stage.			Paroxysm.		
Sept.	from	to	lasting hrs.	from	to	lasting hrs.	from	to	lasting hrs.	from	to	lasting hrs.
15,	2 P. M.	3	1	3	5	2	5	7	2	2 P. M.	7 P. M.	5
16,	2 P. M.	3½	1½	3½	5	1½	5	6	1	2 P. M.	6 P. M.	4
17,	2 P. M.	4	2	4	6	2	6	9	3	2 P. M.	9 P. M.	7
18,	7 P. M.	9	2	9	10	1	10	11	1	7 P. M.	11 P. M.	4

Sept. 16. To have calomel and colocynth, followed by sulphate of magnesia; there is a slight vesicular eruption on the lips.

* Edin. Med. and Surg. Journal, Vol. lv. p. 350, and Vol. lx. p. 369.

Sept. 17. Bowels confined. To have a drachm of compound jalap powder.

Sept. 18. 9 A. M. Five hours before the expected accession he took eight grains of quinine; the fit to-day was put off five hours.

Sept. 19. 9 A. M. Three grains of quinine; he had no paroxysm to-day.

Sept. 23. He has the ague-complexion; there has been no paroxysm since the 18th. He took eleven grains of quinine before the disease was checked, and other sixteen grains afterwards in several doses. As the eruption on the lips generally appears after the periodic attacks have ceased, its early appearance on the second day made it likely that the attack would be mild and short, and that perhaps there would not be another accession, and to observe this I avoided giving quinine on the 16th; however, the paroxysm returned as usual.

CASE II.—William Silverthorne, seaman, royal navy, aged 21, had a paroxysm of tertian on the 14th and 16th of August, and after a lapse of fifteen days of health, was attacked by quotidian on the 31st of August.

Date.	Cold stage.			Hot stage.			Sweating stage.			Paroxysm.		
1842.	from	to	lasting hours.	from	to	lasting hours.	from	to	lasting hours.	from	to	lasting hours.
Aug. 31,	12 A. M.	1 P. M.	1	1	2	1	2	4	2	12 A. M.	4 P. M.	4
Sept. 1,	3 P. M.	4	1	4	7	3	7	8	1	3 P. M.	8 P. M.	5
— 2,	12 A. M.	1 P. M.	1	1	3	2	3	4	1	12 A. M.	4 P. M.	4

There was employed the cold effusion on the head; he took calomel and colocynth, and on September 2, at 9 A. M. eight grains of quinine. As yesterday's paroxysm was at 3 P. M., this was giving the preventive six hours before the next expected seizure, which, however, came on three hours earlier. At 6 P. M., fifteen hours before the next paroxysm, he took four grains of quinine.

Sept. 3. 9 A. M. Three hours before the next fit, he took four grains of quinine.

Sept. 7. There has been no fit since the 2d; the complexion is not of the colour often observed after ague, and there is no eruption on the lips. Before the disease was checked, he took sixteen grains of quinine, and other twelve afterwards; he has been seven days sick; to return to duty.

CASE III.—John Killeen, private, 1st Inc. Militia, aged 34, has been twelve years in the province; never had ague.

June 17. At 11 A. M. was chilly and shaking for an hour and a-half; afterwards there was great heat of skin, &c. followed by sweating.

June 18. The paroxysm returned to-day at 10 A. M.

June 19. Rigors commenced at 11 A. M.—5 P. M. he applied for the first time. To have calomel and colocynth, and, if his

bowels have been opened by that time, to take at seven to-morrow morning, four hours before the next paroxysm, eight grains of quinine.

June 21. There was no fit yesterday; no complaint but of weakness.

June 24. No eruption on the lips; no complaint; to return to duty. In this case there was only one dose of quinine given.

Case IV.—Benjamin Davis, private, royal marines, aged 30; has often had ague.

August 14. At 11 A. M. was chilly, but without any shaking or shivering for about an hour; was then hot and afterwards sweating.

August 15. The fit began at 9 A. M.

August 16. He applied to-day, for the first time, to have purgative medicine.

August 17. At 7 A. M. was chilly, without shivering for an hour, hot for two hours, and sweating for an hour and a half. 7 P. M., twelve hours before the expected return of the fit, he had eight grains of quinine.

August 18. No complaint but of weakness.

August 20. No fit since the 17th; no lip-eruption; to return to duty. In this case there was given only one dose of quinine.

Case V.—Edward Hardy, ship-boy, aged 19, from August 28 to September 6, was ill of malarial remittent fever, and after fifteen days of ordinary health, he was seized with quotidian.

Date. 1842.	First stage.			Second stage.			Third stage.			Paroxysm.		
Sept.	from	to	lasting. hours.	from	to	lasting. hours.	from	to	lasting. hours.	from	to	lasting. hours.
21,	12 A. M.	1 P. M.	1	1	3	2	3	5	2	12 A. M.	5 P. M	5
22,	12 A. M.	1	1	1	3	2	3	5	2	12 A. M.	5 P. M.	5
23,	12 A. M.	1	1	1	3	2	3	5	2	12 A. M.	5 P. M.	5
24,	12 A. M.	1	1	1	3	2	3	5	2	12 A. M.	5 P. M.	5
25,	1 P. M.	3	2	3	5	2	5	6½	1½	1 P. M.	6½ P. M.	5½

In the night he was cool and slept soundly; during the forenoon he felt perfectly well till about 12 A. M. Of the first stage the chief symptoms were rigors and chilliness; of the second, great heat of skin, violent headach and pain in the chest; in the third stage, the pain of chest abated and disappeared, as did also the headach. By about 6 or 8 P. M. he again felt perfectly well, and continued so during the night.

September 24. He applied for the first time. The treatment was, hair cut short, cold affusion on the head, the foot-bath, and purgatives.

September 25. The bowels have been opened. At 9 A. M., three hours before the next fit, he took five grains of quinine.

September 26. Yesterday's paroxysm was an hour later than usual; at 4 A. M. seven hours before the next fit, he had six grains, and at 9 A. M. other six grains of quinine.

September 30. He has had no paroxysm since the 25th; it was checked by seventeen grains of quinine, after that he had other six grains; his complexion is aguish; there is no eruption on the lips; to return to duty.

Case VI.—Richard Handy, private, 1st Inc. Militia, aged 35, has been six years in Canada; had ague for a month at Hamilton, in 1841.

June 5. At 9 A. M. was chilly, and shaking for about two hours, and then passed through the hot and sweating stages.

June 6. The fit began at 10 A. M.

June 7. Rigors commenced at 9 A. M.

June 8. He had no paroxysm to-day.

June 9. He applied for the first time; the first stage commenced at 9 A. M. and lasted two hours, after which the skin was very hot, and he had severe headach for three hours till about 2 P. M., and the third stage ended about half-past three.

4 P. M. To have purgative medicine, and if it operate, to take at four to-morrow morning, five hours before the next accession, eight grains of quinine.

June 10. There is a slight vesicular eruption at the angle of the mouth.

June 14. He has had no paroxysm since the 9th: there was only one dose of quinine given in this case, which is an instance of the quotidian spontaneously changing to the milder tertian. To return to duty. Neither in this case nor in any of the others did I observe, in the hot stages, the *calor mordax* which has been described* as occurring in quotidian.

Remarks.—These six cases I have taken from among the others without any particular selection, and have confined myself to quotidians. The militia occupied log-barracks on the left bank of the river opposite Port Maitland. Of the other two classes of patients, the marines being on sentry at night, were more exposed to malarious influence than the seamen, whose duties occupied them during the day only. The excellent plan for a person ill of malarial fever, of removing from the malarious neighbourhood, † was not practised here. Besides the principal treatment by purgatives and quinine for the disease in general, there was also separate treatment for each of the stages of its paroxysms; as, in the first stage, the warm bath, when it could be procured; in the second, the cold affusion or opium to relieve the headach, and opium to check vomiting when too violent, or continuing from habit only. Even when the patient stated that his bowels were free, a purgative was given, and one containing calomel was pre-

* Alluded to in Dr Craigie's Practice of Physic, Edinb. 1837, Vol. i. p. 44.

† Dr Copland's Dict. of Medicine, Vol. i. p. 942.

ferred; but if a second dose of laxative medicine was required, it was thought better not to prescribe calomel a second time.

The quinine was not ordered till after one or more evacuations had been procured; it was administered in solution, and in practice in the public service, the most convenient and accurate way of doing so seems to be, having ready a quantity of it in the proportion of eight grains of the sulphate to an ounce of water, with eight or more minims of dilute sulphuric acid, a drachm of the solution containing, of course, a grain of the salt. Headach or tormina were not observed to follow the eight grain doses.

In the first case, (Baillie,) the dose given five hours before the next expected fit failed of preventing it; but in the last case (Handy) it succeeded, and after a large dose there was seldom a second paroxysm.

After considerable observation of the comparative rapidity of the cure by repeated small doses, or by a single large one, it is to the latter mode I am at present inclined to give a decided preference.

Grand River, Lake Erie,
August 1843.

ART. VIII.—*Practical Observations on the Lateral Operation of Lithotomy.* By WILLIAM KEITH, M. D., Surgeon, Junior-Surgeon to the Royal Infirmary, Aberdeen, and Lecturer on Clinical Surgery in that Institution.

IN my paper on Hospital Statistics of Stone in the Bladder, as occurring in the Aberdeen Infirmary, published in the January number of the Edinburgh Medical and Surgical Journal for this present year, (No. 158, page 123), the tables show that, between the age of 50 and 60, six were operated on, and all recovered; between the age of 60 and 70, seven were operated on, and all recovered; and that of six operated on between 70 and 80 years of age, five recovered; giving, therefore, only one death in nineteen cases, where the ages ranged from 50 up to 78; a result so unusual that I trust it may form a sufficient apology for my coming before the profession with a detailed statement of a mode of practice that has been crowned with such signal success. I refrain from contrasting the above results with the recorded experience of others at like ages, lest it should seem invidious, and because it is little needed, as such record must be in the hands of every member of the profession who takes an interest in this branch of our art, and all may find full information on the subject in Dr Willis's work on the treatment of Stone in the Blad-

der, published in 1842. I trust enough is said to awaken an interest in the mind of every practical surgeon to the annexed communication, when he is reminded that the mean mortality in England is one in seven and one-fifth; and that in France, Dupuytren admits, that between a fifth and a sixth of all who undergo the operation are lost; that in England, beyond the age of fifty, the rate of mortality rises to one in four or five, while in France, on the authority of the most eminent French surgeons, it reaches one in every two or three.

I proceed, therefore, in accordance with the promise made in my last paper, to communicate and explain the principles that have guided me in practising the operation of lithotomy.

In many particulars it will be found that I agree with the majority of the present English operating surgeons; in some points I differ; the latter only will call for special remark in passing. No claim is put in to originality in being the first to propose the mode of operation which I have so successfully practised and do so strongly recommend. I have borrowed ideas from every quarter, adopting what my judgment taught me was right in the practice of a variety of operators, and discarding what I thought wrong, and after all find that I make but a close approximation to one of the plans of operation as successfully practised by the father of English surgery, Cheselden, 100 years ago, as by any one of his fickle successors. Encouraged in my conclusions by noticing the favourable results in the practice of one class of lithotomists, and profitably warned by the disasters occurring in that of another, I am chiefly anxious to rivet attention on a few fixed principles, by acting out which other operators may, with certainty, calculate on results as fortunate as those above stated.

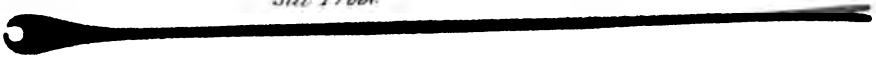
My remarks will bring out what I wish to say more clearly by the aid of classification. I will therefore treat, *first*, of "the preparation of a patient for lithotomy;" "*2d*, of the instruments employed in the operation;" "*3d*, of the line of first incision;" "*4th*, of the line of second incision;" "*5th*, of the mode of entry into the bladder;" "*6th*, of the mode of extracting the stone;" "*7th*, of possible accidents during the operation, and modes of dealing with them;" "*8th*, of the general treatment after the operation."

1*st*, Of the preparation necessary before subjecting a patient to lithotomy.—It will be seen, by referring to the tables already alluded to, that on the average every patient was 60⅔ days in the hospital, 35½ days of which being subsequent to the operation, gives 25⅓ days spent on each case in previous preparation. In young subjects I freely admit that very little preparation may suffice; yet my fixed opinion is, as no one seeks such a mode of relief until compelled by severe and protracted suffering, that every one would be the better for it. Their functions are less

likely to be seriously disordered, and there are resources to draw upon in the vigour of their constitutions during the after treatment; but when the average age reaches 56½, and a foreign body has been so long in the bladder as to acquire a weight exceeding eight drachms, it is not to be looked for that a patient should present in a fit state for operation. In some, especially those far advanced in life, the body is wasted to a shadow, and the strength quite exhausted by incessant suffering and want of sleep. In most the functions of the liver and whole digestive organs are deranged. In all the bladder is in a highly irritable or in an actually inflamed state, as indicated by the amount of pain, the quality of the urine, and the copious ropy deposit from it. When any or all of these exist, I deem it a first duty to attempt their cure. The digestive organs are brought into a better condition by alteratives, (generally the mercurial pill,) and light bitters. The strength is recruited by a generous diet, and the moment the inflammation in the mucous membrane of the bladder is quiet, wine is liberally allowed. The affection of the bladder is treated by enjoining absolute rest, moderate but repeated leeching over the pubis, followed by a succession of medium-sized blisters over the region of the bladder. The above, with the free use of diluents, such as thin gruel or lintseed tea, sums up the treatment in this one class of cases.

Another and very different class presents aged usually from 50 to 55, fat and florid—in short, in the highest state of plethora, and in the worst possible state for lithotomy. These I have bled with advantage, but only as preliminary to a process of fining down by feeding them for two or three weeks on a light farinaceous diet. In those of this class which I have seen, the mucous membrane of the bladder was always inflamed, and leeches were freely applied, twelve and eighteen at a time, at times above the pubis, and occasionally, when the prostate was the seat of more pain than usual, they were applied to the verge of the anus, with excellent effects. Blistering was also practised in such, but with some precautions to hinder the absorption of cantharides,—the chief was to remove the blister at the end of six hours, and complete the vesication by poulticing. In all cases of irritable or inflamed bladder, a flannel bag of hot poultice is the most common application to the hypogastric region, and very soothing it is to the feelings of the patient. It is thus seen how the time has been occupied between the day of admission and the day of operation. The annexed table will show how few or how many of a total of 23 had to go through such discipline, and also the exact time occupied in preparing each case.

The Instruments used by Dr. Keith in performing Lithotomy.



Sharp Hook

Knife

Probe-pointed Bistoury

Staff

1	was operated on upon the		4th day after admission.
1	-	-	9th
3	-	-	14th
1	-	-	15th
1	-	-	16th
1	-	-	17th
1	-	-	18th
1	-	-	20th
1	-	-	21st
2	-	-	24th
3	-	-	25th
1	-	-	26th
1	-	-	27th
1	-	-	37th
1	-	-	38th
1	-	-	44th
1	-	-	51st
1	-	-	74th, whose age was 74.
23	Total.		$25\frac{1}{23}$ as the average.

Some may think I am prolix on this head; but I wish it fairly to be seen that, in my experience, few or none presented in which it would have been safe to have merely administered a dose of castor-oil, and then have proceeded to operate. In a disease that has existed for months or for years, I can see no necessity for hurrying the patient to the operating table, especially as, during the period of preparation, the kind and attentive surgeon will have an opportunity of securing the well-grounded confidence of the sufferer in his skill—a feeling desirable in every case where an operation is contemplated, but one almost essential to the success of lithotomy.

2dly, The instruments I use, and would recommend to others, are few and simple. With the exception of a forceps, the whole will be seen represented of exactly half their natural size, (superficial, not lineal measure,) in Plate IV. at the end of the present number of this Journal.

1. The staff is large, curved, and long in the curve, so as to enter well into the bladder, having a wide deep groove more on its lateral than on its convex aspect, but between them, the groove made to terminate abruptly, as a check, fully half an inch from the point of the instrument.

2. The knife is long in the handle, narrow and short in the blade; and, short as it is, its cutting edge is limited to an inch and quarter from the point; the back of the point is rounded off a little; the heel of the blade thick, so that a very short hold can be taken of it when necessary, and its heel can do no harm when opening the urethra in the very deepest perineum.

3. The probe-pointed bistoury is very narrow, thick in the blade, and squared until it reach within an inch and quarter of the point, which is the extent of cutting edge.

4. The blunted gorget has its left edge quite rounded, the other ground to an edge, and then blunted with a file. The point well rounded into a blunt button. It is a copy from "Cheselden's Conductor," as represented in one of the plates in Heister's Surgery, see page 183.

5. The slit probe will be found useful in pushing home the loop of the ligature, when it is thought advisable to tie the transverse perineal artery in weak and elderly patients.

6. With such a sharp hook, in a case where the artery of the bulb was cut in a fat subject, that artery and the transverse perineal forming apparently one common trunk, the perineum so deep as to prevent ligaturing, and sponge-plugs failing to restrain the hemorrhage, the trunk was easily caught in the fold of the hook, and the bleeding effectually and permanently stopped by noosing the bend of the vessel over the point and heel of the instrument, and allowing the hook to remain in the wound until two days after, when ulceration liberated it. Were it necessary, the pudic artery might easily be hooked and secured in the same way—a screw joining, half an inch above the hook, would allow the handle to be withdrawn, and leave the vessel safe in the close embrace of the ligature and the curved portion left behind.

As to forceps, Cheselden's has never been improved upon—strong in the handles that they may not yield and thereby lose grasping power—long for large stones—the blades of all hollowed—curved towards each other at the points, but not actually meeting—rough in the hollow, but not very sharp round the edges of the blades, lest the stone be thereby cut and chipped. The straight flat blades take an insufficient hold, and their points gape so as to dilate the wound during extraction much more than that above described.

3dly, I now enter upon the consideration of the first incision in lithotomy,—and, strange as it may seem, I find I must join issue with several high authorities, living and dead, and challenge the line they recommend. Considering the narrow space and the fixed limits within which this incision must be made, one might naturally suppose there could be little room for difference of opinion about it. In truth, one of our best surgeons, in a paper on this subject,—the candour pervading which does honour to his head and heart,—so recently as December 1842, in the London and Edinburgh Monthly Medical Journal, affirms, that "there is no difference of opinion as to the situation and extent of the external incision." I allude to Mr Syme. And if I may judge from a paper by Mr Bransby Cooper in the last volume of the Guy's Hospital Reports, published in January of this year, he is very much of the same way of thinking. Yet, notwithstanding the conclusions these eminent surgeons have deliberately come to on this point, I affirm that great and fatal difference of opinion

exists on this very question; and because the space and limits are so confined the inquiry is clothed with importance,—seeing that even a slight deviation from the right line may be followed by serious, nay fatal consequences.

I quote from a living and from a dead authority, as representing a class of operators I think completely wrong. Dr Willis, in his work on the Treatment of Stone, published in 1842, at page 127 says, "In this country all the methods" (of performing lithotomy) "may be said to be reduced to one,—the lateral operation as it is called;—that operation in which, a grooved staff having previously been passed into the bladder, an incision is made in the perinæum from the side of the raphé, *about an inch or more in front of the bulb of the urethra*, downwards and outwards by the side of the anus, midway between that outlet and the tuberosity of the ischium."

Sir Charles Bell, whom I loved as a preceptor, and shall ever speak of with high respect as a scientific surgeon, is the next authority I call in question on this point, and I feel the more bound to do so, that his high rank in the profession, and his beautifully illustrated works on operative surgery, are calculated fearfully to mislead the young and inexperienced surgeon. In the second volume of his Institutes of Surgery, published in 1838, at page 58, he says, when treating of lithotomy, "The first incision is made by entering the knife *between the bulb of the urethra and the ramus of the os pubis*, on the left side of the perineum, and carrying it down past the anus. In doing this you do not cut with the face of the knife; for an incision thus made is sufficient to the eye, but the parts which ought to be divided are not cut. Therefore, strike the scalpel daggerways into the space *by the side of the bulb;* and as you carry it down you must bring it more superficial, or the rectum is in danger."

He says that he subsequently reversed the mode of making the incision, "plunging the knife with the edge upwards in, a little behind, and by the left side of the anus,—he cut quite up to the face of the prostate,—moved it there so as to cut the essential parts, in order to lay bare the membranous part of the urethra; and withdrawing it, he cut across the transversalis, and, carrying the edge at once up by the side of the bulb, completed his incision;" and that no doubt might exist as to the line of incision he both practised and taught others to adopt, he gives plates, (see Plates 18 and 19 of his Illustrations of the Great Operations of Surgery, published in 1821,) showing the line of first incision, and also the whole course of incision onwards to the bladder,—the same line of incision being distinctly marked by asterisks on Fig. 1. Plate X. page 70, of his System of Dissections, 2d edition, 1799, in the view representing the first stage of dissection of the perineum.

In Plate III. Figs. 1 and 2, at the end of the present Number of this Journal, will be seen correct delineations of the views he gives in his Illustrations of the Great Operations, so that by the time this paper is closed every surgeon will be prepared to compare, and, having compared, to conclude whether a difference exists between the lines of incision represented in Plates I. and II. (which pourtray what I have always practised,) and those referred to, and then which are to be preferred.

The evil consequences likely to result from entering the perineum, in the line recommended by Dr Willis and so long practised by Sir Charles Bell, are, *first*, the great risk, or rather certainty, of cutting the artery of the bulb; *secondly*, injuring a part of the urethra not necessary to be touched; *thirdly*, bringing you in upon the bladder so high up between the rami of the pubis that there is not space from bone to bone to allow of the extraction of an average-sized stone. In short, I will now quote Sir Charles Bell's own strictures upon others, and apply every remark he makes to his own line of incision. Strange it is, seeing the error so clearly in others, he should still have so constantly risked the cutting down upon the *symphysis pubis*. At page 59, Vol. ii. of his Institutes of Surgery, he says, "The most common error is in making the incision too high,—feeling for the staff. I have seen full one-half of the incisions above the level of the arch of bone, and consequently useless. The effect of this is, that when the operator has grasped the stone in the forceps, it is driven out of his hold by coming against the arch of the pubis; and he cannot, as he ought, draw downwards, because the incision is not low enough."

These express the sentiments I entertained from the first, of any line of incision in lithotomy commencing anterior to the bulb. I, time after time, satisfied myself in the dissecting-room, of the inconvenience and the danger of adopting such a line. I considered that, whether in male or female, there was only space behind for expansion when any bulky body came to pass by the lower outlet of the pelvis, and that, therefore, the farther I could get my outlet from the symphysis the better. And what is there to fear in going past the side of the rectum, in place of going past the side of the bulb, as recommended?—Nothing—taking care of the gut; there is literally nothing to cut but the *levator ani* and cellular tissue, till you reach the edge of the *gluteus maximus* muscle, or the external sacro-ischiatic ligament, were it ever possibly required to cut so deep. These views resulted in my adopting the line of incision, shown on Plate I. at the end of this Number. The *sphincter ani* being irritated to make it contract, and the perineum put on the stretch by the expanded fingers of the left hand, the knife is entered boldly behind the swell of the bulb

PLATE I.

The Line of first incision in Lithotomy as practised by Dr. Keith.

Edinr. Medl. & Surgl. Journl. N 159.

Hend[illegible] [illegible]ith Aberdeen

The Lateral operation of Lithotomy as practised by Dr. Keith.

Fig 1
The Line of first incision
Lithotomy as practised
Sir C Bell

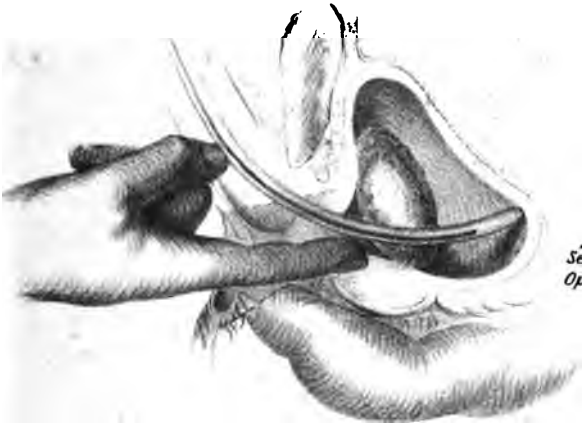


Fig. 2
The Lateral operation
practised by Sir C. Bell
See Plates 18 & 19 of Bells Ill. of
Operations. 1821

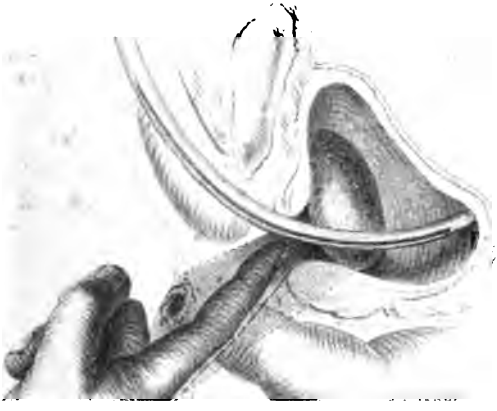


Fig 3
The same, with Dr Keith's
lines of incision shown

close to the raphé, only one inch in front of the anus, in an adult; the knife is directed downwards and outwards, so as to run midway between the anus and tuberosity of the ischium, inclining more to the latter, becoming gradually shallower, the wound terminates at or near the edge of the gluteus muscle, about two inches behind the anus,—the line of incision being straight from the point of commencement.

By this incision I have, without difficulty, removed a stone measuring nearly three inches in diameter. In truth, it makes an approach to the outlet provided by an all-wise Creator in the other sex, enables you to act with your forceps in dilating the bladder and in extracting the stone in the proper line of axis, without fatally bruising the soft parts that intervene between the rami of the pubis and the forceps, when they are entered higher up and more forward; and, finally, it gives the most dependent opening that it is possible to conceive, for the escape of the urine during the recovery; and that opening exactly in a line with the internal incision which you make into the bladder, making the whole wound one clean cut from the neck of the bladder to the edge of the hip. The majority of those who have recently written on the lateral operation of lithotomy seem disposed to recommend the first incision to be carried farther back than it formerly used to be; but, in general, they speak too indefinitely to afford any rule by which a beginner can be guided;—one orders the incision to commence an inch behind the scrotum,—but where is the line seen at which the scrotum terminates; another begins the incision before the bulb, cuts only integument, and, when past the bulb, enters the knife more deeply, and so on,—all advising to pass the anus a little way; but all this is enjoined in Bell's standard work, and still the line laid down is fatally far forward, so that their united directions only encourage the young operator to practise the same. Sir Benjamin Brodie, in his Lectures on the Diseases of the Urinary Organs, published in 1842, is one exception. He is very clear and specific on this point. At page 130, he begins, "I say, then, let the opening in the urethra be made deep in the perineum, *behind the bulb*, and as near as can be to the prostate. Place the thumb of your left hand on the skin over the staff; and, in a man of ordinary size, about an inch and a quarter before the anus. Begin your incision immediately below this, on the left side of the raphé, and continue it backwards and towards the left side, into the space between the anus and the tuberosity of the left ischium. Here you may cut freely; you can injure nothing of consequence." He adds a little after, "All these incisions are, you will observe, made low down the perineum, that is, near to the rectum." And again, "There is also a great authority in favour of this mode of proceeding. Cheselden made his incisions in the way which I

have mentioned, as is proved by the anxiety which he evinced to avoid injuring the rectum. Had he done otherwise, it would never have entered into his contemplation that the rectum was in danger." But for the want of precision on this question in some surgical writers, and the opposing statements of others, I might have introduced and dismissed the matter with the above quotation. As it is a question that admits of final settlement, and one that, from its importance, demands immediate settlement, I invite any one to note the success of those who have been known to practise the low line of incision from Cheselden downwards, and contrast that with the woful experience of such as, from inadvertence or wilfulness, have cut high in the perineum. In closing this section, I would guard myself from being understood as laying this down as *the* important point in lithotomy. I look on it as an important point, as influencing ease and safety in the after-stages of the operation; but my opinion is, that life and death, in the great majority of instances, hangs upon the right performance of the next step in the operation, which I now proceed to consider. That is,

4thly, The second incision. When the first incision has been made, as I have directed, no difficulty will be found in reaching the face of the prostate gland and membranous portion of the urethra,—the forefinger of the left hand directed upwards and backwards, under and in behind the bulb, will answer all useful purposes for dissection,—the transverse perineal muscle at its point of union, and a sufficiency of the *levator ani* have been cut, and cellular tissue only remains between the operator and the parts he has secondly to penetrate. It is worse than useless, therefore, to play with an edge tool in a deep wound where its presence is not required. The prostate reached, the staff, as it lies in the membranous portion of the urethra, has to be felt for; and here I must warn the beginner not to expect to feel the staff very distinctly:—the word membranous deceives such, and they are not at first prepared for what they will always find, viz. a thick firm substance surrounding the urethra, through which they have to cut before reaching the urethra or staff. The knife with which the operation was commenced is inserted in the manner shown in Plate II. at the end of this Number, as close to the apex of the prostate as possible, a small slit is made sufficient to admit with ease the end of the probe-pointed bistoury,—the knife being laid aside, the narrow blade of the bistoury laid well into the groove of the staff is slipped along into the bladder; the point is then fixed in the groove, and the handle moved outwards and downwards to a moderate extent, so as to insure the *sphincter vesicæ*, prostatic urethra, and a small portion of the prostate gland being cut. (A little urine usually flows at this stage.) The gut is in no danger, as the

bistoury has no cutting edge but close at the point, and that portion is at this moment wholly within the prostatic urethra and bladder. Keeping the gut, however, out of the way with two fingers of the left hand, I usually, in withdrawing the bistoury, bring it out of the prostate, and take a sweep along the lower angle of the wound out to the very skin, so that not a fibre can afterwards interrupt either the stone, or the urine in its escape subsequently—laying down the bistoury I take up the gorget, and having lodged its round probe beak in the groove of the staff, I pass it onwards into the bladder, neither with force nor in haste, but by a firm and steady movement, guarding against the possibility of a plunge—the tearing edge directed downwards and outwards, exactly in the line of the external incision, and, consequently, being a direct continuation of the incision begun in the prostate by the bistoury. (At this stage the bladder empties itself of urine by a gush along the hollow of the gorget.) In this way the incision can, if needs be, be carried to the very verge of the prostate, without any risk of the wound extending beyond that gland, the structure of that organ, so different from the tissues composing the coats of the bladder, rendering it an easy matter to tear cleanly the former with an instrument, and a force that only dilates the latter. In this very way Cheselden entered the bladder, but his gorget or conductor, as he called it, was wholly blunt; and it was alleged that he often entered the bladder with it by simply but rapidly dilating the prostatic urethra, which of course occasioned difficulty and hindrance in getting out any but small-sized stones. This led Sir Cæsar Hawkins, at an after period, to put a cutting edge on Cheselden's conductor to insure a positive division of the prostate gland. We have authentic records to prove that, although Sir Cæsar Hawkins succeeded well with his cutting gorget, yet his success cannot compare with that of Cheselden; while in the hands of Hawkins' disciples the cutting gorget has proved so fatal a weapon as at length to have caused it to be almost banished from English surgery. I have looked in vain for any approach to the success of Cheselden since his time, until I find Mr Martineau at the Norwich Hospital, again effecting his entry into the bladder with Cheselden's blunt gorget, and immediately recoveries multiply and deaths diminish, until an approximation to his average of mortality is made. The same success continues in the same institution, resulting from the same cause, in the hands of Martineau's successor, Mr Dalrymple; and I do not remember a fault having been found to their practice, but that at times, as in the case of Cheselden, doubt existed whether the neck of the bladder was incised or not. Another eminent surgeon has laid the result of his experience before the profession, I mean Mr Liston, whose success has been very great; and seeing that as yet he has not used the blunt gorget, his explicit avowal of the principles by which

he has accomplished so many cures, tends powerfully to strengthen the conclusion which Cheselden's experience alone might long since have taught the whole world,—that a small incision into the bladder is sufficient in all ordinary cases for the removal of stone; and that in no case is it safe or advisable to let the second incision extend beyond the base of the prostate; and that the success of all the most fortunate lithotomists has depended upon the narrow limit to which they restricted themselves in dividing the neck of the bladder.

With these ideas in my head, it occurred to me to use a gorget neither blunt nor sharp,—an edge on it that behooved to cut through a substance so solid as the prostate gland, yet so blunt that such a tough elastic membrane as the bladder would stretch upon its edge; and this I found of easy accomplishment. I have several times finished the whole incisions with the first knife, using no gorget when the perineum was unusually shallow, contenting myself, of course, with a very moderate incision into the prostate, and all did well; but in the great majority of the cases the neck of the bladder and prostatic urethra were slit obliquely downwards and outwards to about half an inch, (see the black line of incision on the prostate in Plate II.,) and then finished the incisions, as shown by the continuous dotted line, by the aid of the blunted gorget. Thus I insure a positive entrance into the bladder, obviating the chance of merely dilating the *sphincter vesicæ*, as Cheselden and Martineau are alleged to have often only done,—and thus I escape the risk of cutting parts that never should be cut in this operation. I have seen both the gorget and the knife, in old experienced hands, make a fatal wound in the fundus of the bladder; but that is next to impossible with the gorget I recommend. Take the worst kind of case that can well offer; a deep perineum, an enlarged prostate, with the veins enlarged around it, and the calculus full sized,—how unsatisfactory does the operation prove in every such case, having only scalpel, broad-bladed knife, or cutting gorget to make a sufficient entrance into the bladder with, those can best testify who have encountered such cases—I also have—and the patients beyond 70 years of age; yet by the limited slit in the prostate, effected with ease by means of the long narrow-bladed probe-pointed bistoury, and the gradual, but safe and effectual continuous tear in the same gland by a blunted gorget, with a rather broader blade than usual, the object was easily accomplished, without even the risk of harm having been incurred.

The number and variety of modes and instruments employed by different surgeons sufficiently proves the apprehensions felt at this stage of the operation, and no doubt the hazard is very great; yet to me it seems that the danger to the patient mainly arises from the neglect of the principle I am seeking to inculcate, and

that even by those lithotomists who *speak* of a small second incision. I need not dwell on the ingenious but destructive weapon, the lithotomic caché, either single or double, so patronized by the French, yet so deservedly repudiated by all English surgeons, as there is little fear of its adoption by any one here; but not so with the broad-bladed knife of Sir Benjamin Brodie—his merited eminence is too likely to commend any suggestion of his to immediate acceptance,—and, therefore, I venture to remonstrate against its use. A blade so broad when up at the urethra, where the probe point must enter, will almost touch the left ramus of the pubis as it closes in towards the symphysis, and there endanger the continuation of the pudic artery, or, at all events, the artery of the bulb;—it is not it may, for I have seen it happen in the hands of an old and experienced surgeon. Again, the wound in the prostate will be longer than was contemplated should the assistant move the staff even but a little to one side, by altering the angle of inclination of the knife, for of course the left hand of the surgeon will be too fully occupied in keeping the rectum out of harm's way to admit of much attention being given to the staff; and, *finally*, the broad sharp blade, bellying out without a blunt shoulder as the cutting gorget even had, is exceedingly likely to wound the bladder from within, as that organ falls rapidly in on the evacuation of the urine, and must embrace the blade all round; and in the act of withdrawing such a knife the rectum is a second time in danger. I trust I may be pardoned the freedom of these strictures. There is no man in the profession I so highly respect,—no man who has so fairly stated those views on the subject of lithotomy which I only aim at corroborating; yet my higher respect for the truth compels me to warn the unwary, where he would, unintentionally, lead them wrong. All the dangers alluded to are escaped from by the use of the blunted gorget, and as free and as clear an opening into the bladder obtained as by the broad knife commented on.

5thly, But another advantage accrues from the use of the gorget,—it lies with safety in the bladder, and, the staff being withdrawn, becomes the actual conductor of Cheselden, guiding the forceps without violence safely into the bladder,—a business not easy to the most expert in a deep perineum,—or if so, then the ease has been purchased by a deep incision so free as will, in all probability, cost the patient his life. To all, therefore, the hollow of the gorget presents a fair channel along which to press the forceps till lodged in the bladder. To a beginner such a help is invaluable; only let me warn all beginners that their trust must not rest on mechanical appliances, but on a thorough knowledge of the anatomy of the parts concerned, a right apprehension of the principles that should control every step in the operation, and a calm collectedness of

mind ready for any emergency. The staff is lodged in the urethra and bladder, that the operator may find a sure director into the latter when his dissection has brought him to the face of the prostate; let it, therefore, remain fixed in the mesial line, pressed against the *symphysis pubis* during the whole operation, and then he knows where to find it, just where by nature the urethra runs. The advice given by some writers, to make the assistant meet the knife by pressing the convexity of the staff against the left side of the perineum, is, to say the least of it, injudicious; it occasions a risk of the point of the staff escaping from the bladder; it alters the natural position of parts, and limits the space into which the operator has to cut, pushing his incision towards the ramus of the ischium, under the edge of which the pudic artery runs, the nearer to which that the lesser arteries are cut the more energetically will they bleed; and, *lastly*, the parts are thereby so pressed down upon the rectum as to endanger it at the very first cut.

Then, again, the blunt gorget is supplied, not as a substitute for anatomical knowledge, but as an instrument capable of opening the neck of the bladder just as far as safety admits, (that is, as far as the prostate gland extends,) and quite as far as sound principle requires, seeing that the elasticity of the coats of the bladder is sufficient to allow of the easy escape of any fair average sized stone, after that gland and the sphincter of the bladder have been divided. Surely much need not be said to satisfy any surgeon that one is quite safe to draw upon the elasticity of the coats of the *living* bladder to allow of the escape of a large stone through a comparatively small opening; the prostate might be injured and shattered by great dilatation; no elastic quality resides in it; but it is essential to the very function of the bladder that it shall dilate and contract,—at one time reduced to the size of an egg, and in six hours expanded to the size of a human head—and again, in half-a minute, by the power of the will, down to two and a-half inches in diameter. What difficulty can there be in obtaining for a minute or two the expansion of a small wound in such a membrane, freed of the girding effect of an uncut prostate, to allow of the escape of even a large foreign body, forcibly withdrawn in the grasp of a forceps, whose blades, smooth on the back, come out possessed of all the powers of the wedge; and why, then, incur the fatal risk by extending the incision beyond the base of the prostate, of laying open the pelvis to the ingress of urine, by wounding the ileo-vesical fascia, when you not only have this elasticity in the coats of the bladder to draw upon, but actually do draw upon in every case where the stone reaches an average size, one and three-quarters, by one, and by one and a quarter inches in diameter? Enclose such a stone in the blades of a forceps and then

say if a lineal wound of even three inches long will admit of its exit without considerable expansion—and who among the advocates for free incision is prepared for such cutting, all to give transit to a foreign body occupying half a minute in its progress, and the opening then having to be healed up? I would only add before closing this section, that much fallacy has been introduced into this question by parties experimenting on the dead body, and then applying their conclusions to the living,—forgetful all the time that the power of a living muscle, whether in resisting or sustaining, is to a dead muscle as 1000 to 1,—in truth they can form no fit subject of comparison.

6thly, Trusting, as I do, so much to the dilatability of the coats of the bladder for affording a safe exit to the stone, it will at once be seen that some caution is required in its extraction, and I come, therefore, in the sixth place, to say a few words on that subject. It has often struck me on witnessing lithotomy, that there was little or no system or fixed principle ruling the surgeon in this stage of the operation. When searching for the stone, it seemed only a succession of ineffective glamps with the forceps. When extracting—a succession of violent pulls, equally ineffectual for the attainment of the end desired. With the closed forceps let the stone be searched for—felt; let the closed blades on their flat side be pressed down on one side of the calculus to below its convexity, then fixing the lower blade in that position, with reference to the stone, let the handle of the upper blade drop, if need be, pressed down, until the blade is raised quite above the level of the stone, when it only requires a semi-rotation of the instrument, the lower blade still occupying the fixed point, and the stone is at once enclosed in its embrace. This for stones of average size and upwards; small stones may lodge, where the prostate gland is large, in the hollow behind it, or where the person is pot-bellied, it may be shelved above the *symphysis pubis;* in either case the stone may be easily found by a forceps slightly curved. Where too much water has been in the bladder at the time of operation, the circular fibres may contract, and enclose the stone in the very fundus of the bladder. This difficulty is to be detected and overcome by the steady progress of a straight moderate-sized forceps, onwards till it reach the stone. I have seen the forceps go to a great depth in such a case, and nothing wrong but this longitudinal elongation I speak of.

The stone fitly seized in the smallest diameter, the dilatation of the wound begins in earnest, by a firm but steady downward extracting power, gently moving the handles from side to side, a little upwards and a good way downwards, from time to time allowing intervals of rest to the parts, and to the operator's own hand, but never for a moment relaxing the grasp of the stone itself. It is annoying to have to witness the necessity of going

again and again to poke about the bladder, the stone having been once fairly and firmly caught. Having rested, the power must be again applied, coolly, calmly, firmly bearing down, exactly as an accoucheur does when delivering a fœtal head with the forceps. Proceeding thus a very few minutes suffice to complete the delivery; the stretched fibres speedily retract, and a comparatively small wound only remains to be healed, and that entirely surrounded and supported by the prostate gland, which must favour its closing up.

Lest doubt should still exist as to the competency of the incision effected by my blunted gorget, or as to the soundness of the views I lay down regarding the safety and sufficiency of the opening obtained by dilating the tunics of the bladder to give exit to any average sized stone, I will simply state the particulars of the very last case that went through my hands. On Saturday last, the 17th current, David Imray, from Midmar, aged 68, a poor broken-down subject, having been recruited by good living for nine weeks, was brought to the table. His limbs could only be separated a few inches in consequence of repeated attacks of rheumatic inflammation. His legs were, therefore, held over my head during the whole operation. I made the external incision, as usual, very low, and three and a half inches long,—opened the membranous portion of the urethra, close to the prostate, with the knife,—entered the bladder with the probe-pointed bistoury, (urine flowed by the wound,)—inserted the probe-point of my broadest blunted gorget into the groove of the staff,—laid hold of the staff with my left hand, and by a steady onward movement passed the gorget into the bladder, the urine gushed out along its hollow. (The gorget used measures across exactly one inch and one-eighth at its broadest point, the one I usually employ measuring at the same point seven-eighths of an inch.) The stone, though large, was readily seized, and with patience, but firmness, extracted. So much did it distend the perineum when it reached the external wound, that I had to touch the skin at the upper angle of the wound with a bistoury to give it easier exit. The whole time occupied was nine minutes, until he was removed from the table. The stone thus extracted in less than nine minutes (about five) weighs three ounces and three-fourths, and measures seven inches and one-eighth, by five inches and five-eighths in circumference, to which add the thickness of the blades of the forceps, and I think I make out a strong case in favour of my views, for the old man is already out of all danger, as far as the effect of the operation is concerned. I removed the tube from his bladder on Tuesday, 20th February, and to-day, February 22d, his urine is copious, his tongue is moist, and his pulse is natural. Let no one say the case is selected, for of all the unpromising subjects I have operated on, he certainly looked the worst.

7thly, The accidents at all likely to occur in the performance of this operation are, 1*st*, bruising of the soft parts; 2*d*, hæmorrhage; and 3*d*, wounding the rectum; a 4*th*, usually enumerated in this class, viz. infiltration of urine, may, I think in future, be excluded from the category.

1*st*, When the stone is very large the risk of bruising during the extraction is very great, and the after-consequence, in aged subjects, is very commonly death, from extensive suppuration within the pelvis, should the patient not have sunk during the inflammatory stage; yet the case just detailed shows what can be accomplished by patience and a low outlet without free cutting. I was prepared, should any marked hindrance have offered, to use the blades of the forceps as a director while extracting, and with a probe-pointed bistoury have notched the right side of the prostate gland, and so have got a more free passage for the stone; but it was not needed. This plan I would, however, recommend in preference to breaking down the stone, which is a proceeding, fond as I am of lithotrity, which I cannot approve of. The positive injury inflicted in passing so often to and from the bladder with angular fragments, and the risk, almost amounting to certainty, of some fragments remaining in the loose folds of an empty bladder to form nuclei for future stones, ought, in my opinion, to discourage such a proposition. If so large, that the dilating quality of the bladder, with both sides of the prostate cut, is not likely to admit of the passage of the stone, then the high operation would form an infinitely preferable mode of giving it an easy and a safe escape, and should be selected.

2*dly*, Hæmorrhage I always view with apprehension. A state of depression happens after this operation in almost every case, which I find much aggravated by even what is called a moderate, by some an advantageous hæmorrhage. It may be because I bring none to the table in a state to require depletion; but be that as it may, when the *transversalis perinei* artery bleeds with any vigour, I invariably lay down the knife, and with a tenaculum, or the spring forceps, take up and tie the bleeding vessel. I never operate against time; my sole object is to save my patient's life, and this proceeding has therefore everything to recommend it. The vessel is at the moment easily seen and secured; not so in a little after, when the parts get infiltrated with blood. The after steps of the operation are carried through calmly, as no continuing hæmorrhage hurries you—the urine comes away afterwards clear at a more early period, much to the relief of the surgeon; and the patient's strength is husbanded. Should the artery of the bulb be cut, there presents only an additional reason for instantly adopting measures for effectually suppressing the flow of blood. I have elsewhere in this paper shown how it may be easily commanded. I have succeeded, by the pressure of sponge plugs dipped in tinc-

ture of benzoin, surrounding a tube, and pressed in between the rami of the pubis. The case recovered, but the hook is more to be depended on. Better far, however, to cut low and escape such a casualty.

3dly, I will not deny that the operation I advocate does endanger the rectum; but I must say, with ordinary care injury to it is not likely to happen. The first incision only requires depth at its upper angle, for about one-third of its length; the remaining two-thirds ought to shallow rapidly, requiring little more than the integument to be cut, as the tissues beneath are elastic in a high degree, and yield readily during the extraction of the stone. I am quite convinced that the rami of the pubis have most commonly been the cause of the many desperate struggles we have heard of and seen in the extraction of calculi. There seems to be an unusual fear in the minds of some surgeons at the idea of wounding the rectum, with which I cannot sympathize. How often do we all cut it up, one, two, or three inches for the cure of *fistula in ano*, and far from harm happening, it turns out one of the most successful and satisfactory of surgical operations. Once, in extracting a large angular fragment of a stone which had fractured in the grasp of the forceps, a small wound was made in the side of the gut, and twice a nitch was made with the knife. In the first instance, before closing the operation, I divided the *sphincter ani* as if for fistula, cutting through from the nearest point at the upper angle of the wound. By this proceeding, I left so little tissue to close in upon the urethra, that it gave me much after annoyance, and taught me what I earnestly recommend to others, to cut the sphincter through at the lowest point of the anus, and then push the lateral flap up into the gut to cover in the membranous portion of the urethra. The result will prove quite satisfactory. The above case strongly illustrated to me the ground of objection to the recto-vesical operation—an operation which, I am certain, might be practised with great safety to life, could the suggestion I have offered with equal certainty ensure after comfort. But again, I would say, the question is needless if the low lateral incision is adopted.

4thly, As I have before said, fatal infiltration of urine arises in every instance from the deep incision extending beyond the base of the prostate gland, and penetrating the fascia that passes from the sides of the pelvis on to the bladder at the boundary line of the gland. Once past this defence, and the urine comes in contact with the peritoneum—the necessary consequence of which is death—less from pure peritoneal inflammation, judging from all the cases I have seen, than from the poisonous absorption of urine. I can conceive infiltration of the cellular tissue along the wound, of a very troublesome, but far less disastrous character, from the *lips* of the wound having been allowed to close before lymph had seal-

ed up the divided cells, to guard against which I invariably keep a flexible tube in the bladder until from thirty to fifty hours after the operation, according to the age of the patient; but the occurrence I refer to as the most fruitful source of mortality in this operation cannot be mistaken. The patient goes on well until twenty-four hours after the operation, and the pulse natural, when the urine becomes less copious—the tongue becomes dry—the belly rather full and uneasy, and the bowels flatulent. Four hours more and the patient's countenance has assumed a pinched anxious look; his pulse up to 100; his manner is hurried; he wanders in his ideas; at thirty hours his pulse is 120; his belly tumid and tense; urine scanty; almost suppressed; skin covered with a clammy sweat; tongue dry as a board; even *local* depletion will close the scene at the end of thirty-six hours. If cordials are administered the feeble and delirious struggle may be protracted till fifty-two hours shall have elapsed from the time of the operation; but a cure, after this train of symptoms is kindled, I have never seen, and no one can see in them any affinity to what offers in peritonitis. It is clear to me that a poisonous fluid has got where it never ought to be, and to guard against the risk incurred by the use of cutting instruments at such depth, and in the immediate proximity of such, though unseen, dangerous boundaries, I entreat surgeons to lay aside knives, cutting gorgets, and lithotomes, and fall back on the safe, sufficient, and successful mode and instruments suggested and used by Cheselden, as now laid down in this paper.

Rude violence and unnecessary haste in extracting a large stone might, no doubt, tear the bladder far enough to allow of the infiltration I have just been describing, but such an abuse of power would only prove the operator to be wholly ignorant of the very first principle upon which the suggested plan of operation is based, and could in no way weaken the force of the evidence I adduce to prove, that surely there is a fixedness and a soundness of principle in the practice that has led to such an unusual exemption from mortality, at the very age at which the ratio of mortality is the highest, by all the other modes of operation at present in use.

8*thly*, *On the treatment after the operation.*—Much of the personal comfort of the patient during the after-treatment will depend upon the unceasing attention of two experienced nurses, but his safety and progress rest, under God, on the surgeon's skill and care. For six hours after the operation the surgeon should never be above an hour at one time absent from the bedside,—noticing the tube to keep it pervious, the quantity and the colour of the urine,—and resting satisfied on the head of hæmorrhage only when the urine flows clearly as well as copiously. These two points

gained, his visits may then be dispensed with for intervals of four hours, until the thirtieth hour has passed. That hour come and gone without constitutional sympathy, and all danger from infiltration of urine is past, the tube may be safely withdrawn, although in old subjects some hours later may be preferable, to give time for lymph to be poured out and consolidated; and now the visits need only be repeated every six hours. This, I think, should be continued for a week; it enables the surgeon to keep every thing right, which is easier and safer than having to set them right; it affords opportunity for cheering the patient on, also, a matter of no light moment, the tendency to despond after this operation being very great. This, it might be easy to account for; so great has the mortality been after this operation, that the great majority of persons labouring under stone will never entertain the question of operation until death itself begins, from protracted suffering, to stare them in the face. They then begin to reason, that die they must, and if so, better choose the easiest because the shortest path. Their settlements are very generally the last document they sign before coming to the operating table; and is it any wonder that it is sometimes even difficult to convince them that they will recover, after danger has entirely passed? For this reason all condoling friends should be shut out for days after an operation. I have seen them occasion infinite harm, and bring on nervous symptoms very annoying, if not alarming. Let the surgeon himself minister to the mind as well as prescribe for the body; and while he rests on the blessing of God for success in the case, let him watch and strive as if the cure depended on his unaided efforts. Unless surgeons are in a sense determined not to lose a case, they will find it an easy matter to let one slip through their fingers during the after treatment. It is the known prevalence of this feeling of despondency that has hitherto discouraged the practice of operating on more than one case at or about the same time, lest, should one die from the operation, the other should sink from apprehension afterwards. I would not treat lightly the fear of harm happening, but only suggest that, in hospital practice, there are good and cogent reasons why the fear should be disregarded. The surgeon, when nerved for such an operation, feels more ease at a second, and still more freedom at a third following in rapid succession. The parts are bright in his mind's eye, and his hand is in the way of it, and all this the patient gets the benefit of. Then two nurses can as easily attend to three in the same ward, or in adjoining closets, as to one; and, again, the surgeon's frequent calls are well requited by the feeling that so much good is being accomplished. I have repeatedly had two, and lately had three in one day, and found no inconvenience result; but, mercifully, no casualty occurred in either of the instances. I can testify

that the last operation is always best done, if degrees of comparison can be said to exist where all recovered well, which is what I hold as the only evidence of a well-performed operation.

From the total silence on the subject in most practical works, a beginner must often conclude that, the operation safely accomplished, there is little more to do; but this is a great mistake. In old or feeble subjects the struggle for life only then begins. No doubt, in the young and vigorous, mild diet, a frequent change of the drawing sheet, to keep the bed dry, and an occasional laxative, is all that is required, and in from fourteen to twenty-one days they are going about sound and well. But in those more advanced in life, a diligent watch must be kept on the state of the secretions, the tongue kept clean—often a difficult matter—soups must be allowed from the hour of operation, wine and animal food allowed from the third day, and the former with such liberality as the patient can bear. In George Gray's case, see Table of particulars in the last Number of the Edinburgh Medical and Surgical Journal, his recovery took thirty-four days, during which time the average allowance of port wine he had was eight ounces daily. His age is 73, and it is not a week since I heard of him driving his horse and cart, and sharing in all his farm-work. I am not here advocating the use of wine in every case,—the feeble only require it; but I do advocate the adoption of more generous treatment as to diet, after this and most other major operations, and the utterly discarding of that bugbear fear of inflammation, which has occasioned so many to be starved out of existence. If it arise, treat it, and withhold the supplies then; but, while there exists a call upon the constitution to heal up a great wound, let no idle, and so generally groundless, fear induce the surgeon to keep the balance of life trembling, from sheer want of food. Much discomfort will be escaped from, if careful nursing, the use of spirit lotion, and plenty of prepared lard, can keep the nates from excoriating. I have kept a note of how many folded sheets required to be drawn every twenty-four hours, in a number of cases, and for ordinary and reasonable comfort to the patient. During each of the first eight days after operation, eight large sheets are daily requisite.

It is during the convalescence that I see most clearly the advantage of previous preparation. The patient is in good health, has a fair appetite, and is nourished by what he takes. I ascribe the recovery of several of my old men entirely to the care bestowed on their previous treatment. No art could have carried them through applied in any other way.

I think I have now freely communicated my views on my practice, and the principles that guide me in the performance of lithotomy.—To sum up.

The patient should be previously brought into the best possible

state of health. Tongue clean, and urine as nearly natural as may be. The nates clean shaved—a dose of castor oil administered on the evening prior to the day of operation—an enema on the morning of that day—and only the accumulation of thirty minutes' secretion of urine in the bladder—prepare the patient for the operating table.

A large curved staff, with a deep groove on its right lateral aspect, is then to be introduced into the bladder and the stone felt. The feet and hands to be then firmly secured to each other. The nates brought just over the edge of a table, thirty inches high. The knees steadied by two assistants, but not tied by a tape passing over the nape of the neck. The staff held by the third and chief assistant, from the commencement to the close, firmly in the centre line of the perineum, fixedly against the *symphysis pubis*, and fairly into the bladder, care being taken that no movement of the patient, and no dropping of the assistant's hand, shall occasion its withdrawal from that viscus until an entry has been effected. The external incision to commence at the raphé one inch anterior to the anus, to pass outwards and backwards midway between the anus and *tuber ischii* to the extent of three inches or more from the point of commencement, according to the probable size of the calculus, previously ascertained. The wound deep at its upper angle, only to be carried on with the finger, almost unaided by the knife, fairly below, and then in behind the bulb of the urethra, until the face of the prostate gland and membranous portion of the urethra are felt; the knife is made to enter the groove of the staff in the latter, and just notch the apex of the gland; this opening is enlarged, continued onwards to the bladder, the *sphincter vesicæ* and prostatic urethra cut in a direction outwards and downwards, by means of the narrow-bladed probe-pointed bistoury. The blunted gorget carries this incision to the very base of the prostate, if that should be required. The forceps, easily and safely introduced along the hollow of the gorget, is then made to embrace the stone, as formerly directed, and becomes a safe and efficient dilator of the coats of the bladder during the extraction of the stone. There are few operations to which the adage, *Festina lente*, does not apply. To lithotomy it is especially suitable, and to this stage of it peculiarly applicable. At it "make haste slowly" should be ringing constantly in the surgeon's ear.

One other principle that has exercised great influence over my success I must announce before closing. Believing, as I firmly do, that the issues of life are wholly in God's hands, I never fail urgently to implore his presence and blessing on every operation. From my bended knees I approach the operating table, the immediate effects of which is to impart to me a calmness that nothing can ruffle, a self-possession that has never been disconcerted—and occurrences have happened that might have embarrassed any one—

a steadiness of hand, and fertility of resource, that I thankfully acknowledge as gifts from God, while the final results have come out only such as could issue when the blessing of the Almighty descends.

Explanation of the Plates.

Plate I. shows my ordinary line of first incision in lithotomy, and the manner in which the staff ought to be held.

Plate II. represents a section of the pelvis, showing the anatomy of the parts concerned in lithotomy, copied in great part from Watt's views of the pelvis. Into this sketch I throw the lines of incision I practise. The black line at the apex of the prostate shows all that is cut both by knife and bistoury; the dotted continuation indicates what is accomplished by the blunted gorget. Altogether it correctly conveys my ideas of what the lateral operation should be, in the position, direction, and extent of both the external and internal incisions.

Plate III. shows, Fig. 1, a correct copy from Bell's Illustrations of the Great Operations in Surgery, Plate 18, giving his line of first incision.

Fig. 2 shows, from the same work, his own view of his own lateral operation. The incision mainly in front of the anus, traversing the bulb of the urethra, passing close under the *symphysis pubis*, and reaching the bladder some way above the level of the natural entrance into that organ by the prostatic urethra.

Fig. 3. Taking the same view of the anatomy of the parts, I pourtray the lines of incision I recommend, showing their bearings to the anus, being chiefly behind it, to the bulb of the urethra, being quite below it, to the *symphysis pubis*, being as far from it as possible, and to the prostate gland commencing with the prostatic urethra, the incision is then wholly confined within the limits of that gland.

Plate IV. Showing the instruments, speaks pretty plainly for itself.

257, Union Street, Aberdeen,
23d February 1844.

Art. IX.—*An Account of the Epidemic Fever as observed in Leith, with the Statistical Details of Three Hundred Cases.* By Robert Jackson, M. D., &c., Licentiate of the Royal College of Surgeons, Resident Surgeon to the Edinburgh and Leith Humane Society, Leith Dispensary, and Casualty Hospital.

The epidemic fever existed in Edinburgh for a considerable time before it made its appearance in Leith. The communication between the towns is constant and of the freest description, and the distance so trifling as to make it a matter of wonder that we were not visited with it sooner. In the month of September 1843 the first cases were noticed. No great amount of any form of fever had existed in the town for about a twelvemonth previous. In the months of July and August, however, a severe form of influenza prevailed, which was occasionally accompanied with pretty smart

fever. The epidemic has now nearly disappeared, having continued between five and six months, during which time nearly 1800 cases must have occurred. The accompanying table will show the number of cases which were observed during the period which it lasted, exclusive of 216 hospital cases, and about 300 whose names were unavoidably not entered in the Dispensary books.

Table from Dispensary Records.

In September 1843, upwards of	144 cases occurred.
October,	417
November,	331
December,	224
January 1844,	138
February,	45
	1299

The population of the town of Leith may be reckoned at about 25,000, and the number of cases being 1800, makes it average nearly 1 out of every 14 of the whole inhabitants, which will sufficiently show the extent of the epidemic. But when it is further stated that the disease was almost entirely confined to the lowest classes of society, inhabiting a very limited district in the centre of the town, it will be understood how very few of that class of society escaped.

Great misery and destitution prevailed at the time amongst the poor, adding additional horrors to the disease, and it was not unusual to see whole families prostrated under it, covered with rags, and in want of the common necessaries of life. In one stair alone above twenty cases were under treatment at the same time. A fever hospital was soon, however, established, which enabled those wretched beings to be properly treated and nourished. It was curious to observe the almost complete absence of all other diseases during the epidemic; few cases of any kind occurred; and even the common and usual complaints incident in the season, or other circumstances, have been nearly totally superseded.

The short consideration of an epidemic so severe, and, as I understand, previously unknown in the town, cannot be without interest, and in my capacity of Resident Surgeon to the Leith Dispensary, the only one in the town, I had an opportunity of attending by far the greater number of these cases, and of witnessing their progress. On this ground have I ventured to give an account of the epidemic.

History.—The epidemic fever, as witnessed in Leith, although possessing many striking similarities to other fevers, yet, considered from its invasion to convalescence, its determined course, its peculiar and regular succession of symptoms point it out as a fever *sui generis.*

The symptoms of invasion were those generally observed in pyrexial diseases, but of a more sudden, distinct, and brief duration. A man, previously in good health, leaves his house in the morning, taking his meals as usual. During the day, while busy at his employment, he is suddenly, and without warning, seized with a degree of sickness, pain in the back, slight feelings of chillness, and general

uneasiness. In a few hours after he has a severe rigor, followed in the evening by intense headach, with increased pain in the back; eyes suffused; the face is flushed, and has a peculiar anxious expression; the skin is hot and dry, the tongue slightly white, bad taste in the mouth, and the pulse is 110. Such is the general form of invasion observed to take place in this town; but in many cases the invasion is by no means so sudden, at least not so severe, patients occasionally presenting themselves at the Dispensary consultations for advice after having been one or two days unwell.

The fever, having once fairly set in, runs its course with remarkable steadiness, terminating or having a crisis of the pyrexial stage, in various proportions of cases from the fifth to the tenth day. A few cases have been apparently prolonged from the tenth to the seventeenth day without any evident crisis, but some complication was generally the cause of the continuance. From a state of considerable suffering and great febrile excitement, the patient, at the period mentioned, being at once relieved by some critical evacuation, continues free from all febrile disturbance for a certain number of days, when again he is seized in the same manner as at first. This second attack of fever, or relapse as it is generally termed, has happened in the number of cases I have reported from the sixth to the twenty-third day from invasion; a crisis similar to that in the first attack occurs and the patient is relieved. In a very large proportion of cases the disease now terminates, and the patient returns to health, although but slowly.

In some cases, however, a few days after the crisis of the second attack, the patient was again destined to undergo another attack, and in many instances where this has occurred, it has proved even more severe than either of the two former. Some authors, describing the same fever as occurring in Edinburgh and other places, take notice of a fourth, and even of a fifth attack; but none such has come under my notice, excepting in one case of a young woman (Bruce) about 18 years of age, who, I had reason to believe, had four attacks of the disease. In a few young children, too, I have suspected such an occurrence, but cannot speak positively.

Such is a brief outline of the course of the epidemic fever. I shall now notice its peculiar symptoms and characters.

The febrile symptoms having set in, in the manner mentioned, continue to increase; on the second day they are aggravated in every respect; the pulse is now found remarkably quick, it being not uncommon to find it at this early stage of the disease so high as 140 to 160. The headach, pain in the back, thirst, dryness of the skin, nausea, are all increased. The patient is restless, uneasy, and at night is unable to sleep. At this stage of the disease, upon inquiry, we generally find constipation of the bowels to have existed for several days.

The headach does not often continue beyond the third day, and is often relieved by epistaxis. A symptom almost universally present is excessive tenderness and pain of the epigastric region, much increased by pressure, and giving rise to great uneasiness, occasion-

ally accompanied with severe vomiting. Rheumatic pain in the side, and in different parts of the body, is not unfrequent. The tongue becomes more foul and coated than before, being either white and creamy all over, or having two longitudinal streaks of dry brown fur down the middle. The tip is almost constantly clean. In some cases, generally in the aged, the tongue is preternaturally red, dry, and glazed, with horizontal cracks. The pulse continues for some days above 140; the urine is scanty and high-coloured; the surface is hot and dry, and there is considerable prostration of strength.

The crisis of the fever can sometimes be foretold by the pulse becoming somewhat less frequent, and the supervention of slight rigors. At one time a single severe rigor will occur, or perhaps several, followed by a copious and free perspiration all over the body, but chiefly on the trunk and face, lasting generally for a few hours, and occurring frequently during the night. This sweating is followed by a short sleep, and when the patient awakes he feels himself free from all pain, and in an easy and pleasant state. The crisis, however, does not always occur either so distinctly, or in so simple a manner. Sometimes before it takes place the patient becomes delirious, raves and gets out of bed; at other times he becomes restless and agitated. Convulsive fits have even taken place before the occurrence of the crisis. This, I find, has been remarked in Glasgow. In by far the majority of cases the crisis takes place by sweating. I have occasionally seen the disease terminated in a deep sleep without perceptible perspiration. In two cases only have I known it take place in diarrhœa; in one of these cases it was attended by two fits. My notes of the crisis in this case are these:—

"David Easton, aged 10, Tuesday, 30th January, seventh day of disease. To-day I find he has got turn or crisis, reported to have happened as follows:—About five o'clock last night was seized with severe diarrhœa, passing black and frothy matter; bowels moved ten or twelve times during the night. Took what his mother considered a convulsive fit about ten o'clock; limbs became rigid, the body motionless, the eyes turned upwards. This state lasted about twenty minutes or half an hour, when he became very restless, and continued so till three o'clock A. M., when he had another fit of the same kind as before. He then settled and slept till six o'clock A. M., when he awoke, felt much better, and every way relieved. At visit, pulse 70. The day before it was 150."

Soon after the crisis the tongue begins to clean, the pulse falls very low, often to 45 or 50 on the second day, and much general weakness is present. An almost constant occurrence after the attack is the supervention of articular pains:—these are often dreadfully severe, and cause great suffering to the patient. Their duration, however, does not exceed a few days. Sometimes apparently partial local palsy is present; sometimes even hemiplegia appears to exist for a time. The duration of the first attack varies considerably from the fifth to the twelfth day. To shew in what proportion of cases the crisis occurred on certain days, I have drawn up the following table from notes taken of 300 cases.

TABLE showing duration of first attack in 300 cases.

No.		Day.	No.		Day.
20	had the crisis on the	5th	3	had the crisis on the	11th
48	- -	6th	2	- -	12th
52	- -	7th	10	prolonged without evident crisis from	13th to 17th
98	- -	8th			
25	- -	9th	—		
42	- -	10th	300	Total.	

It will be observed from this table that, out of 300 cases of the epidemic, the crisis of the first attack occurred on the eighth day in ninety-eight cases,—nearly one-third of the whole,—that the next largest number had the crisis on the seventh, and the two next on the sixth and the tenth.

From so large a number of cases, and from such a large majority having the crisis on the eighth day, we are, I think, fairly entitled to lay down the eighth day as the one on which the crisis of the first attack most frequently occurs. I am aware the establishing of this fact will be of little use in practice, and, perhaps, in theory may be doubtful; but, at all events, it proves the eighth day has been the critical one to a very large proportion of the cases reported, which is curious, inasmuch as it is not considered as a critical day by the writers on continued fevers.

The patient, after the crisis takes place, having enjoyed a few days of seeming freedom from every complaint, is again suddenly seized, generally with a rigor, or a succession of them, and undergoes a like attack to the first one. The day counted from the first invasion of the disease, in which this second attack or relapse occurs, will be seen from the following table:—

TABLE showing day of second attack or of first relapse in the above 300 cases.

No.		Day.	No.		Day.
1	relaps. from 1st invasion on	6th	6	relaps. from 1st invasion on	17th
1	- -	7th	5	- -	18th
8	- -	8th	0	- -	19th
27	- -	9th	5	- -	20th
32	- -	10th	1	- -	21st
37	- -	11th	3	- -	22d
29	- -	12th	2	- -	23d
31	- -	13th	21	had no relapse.	
31	- -	14th	3	died in first attack.	
27	- -	15th	—		
30	- -	16th	300	Total.	

The day of relapse is most frequent from the ninth to the sixteenth day. The number of cases occurring on these two days, or on the days between them, is nearly equal in amount. So early as the sixth day, a few hours only intervening from the first crisis, a relapse has happened, and, so late as the twenty-third day, this has taken place.

The duration of the second attack or relapse proved nearly equal to that of the first. Those persons who had a mild primary attack were generally observed to have more severe secondary ones, and *vice versa.* The exact proportionate duration of the second attack will be seen from the following table:—

TABLE showing duration of second attack or of first relapse.

No.		Day.	No.		Day.
6	Crisis occurring on the	2d	3	Crisis occurring on the	11th
20	- -	3d	2	- -	12th
45	- -	4th	3	- -	13th
44	- -	5th	3	- -	14th
21	- -	6th	1	- -	15th
20	- -	7th	21 had no relapse.		
67	- -	8th	3 died.		
12	- -	9th	—		
29	- -	10th	300 Total.		

By comparing the above table with the one showing the duration of the first attack, it will be observed that the shortest period of the first attack extended to five days, when in the second it, in a few, lasted only two days; and that, in the first attack, the twelfth day was apparently the longest, when, in the second, the crisis was evidently postponed, in a few cases, to the fourteenth and fifteenth day.

These tables agree, however, in one respect, which is, in the largest proportion of cases in both having the crisis on the eighth day; sixty-seven cases terminating in the second attack on that day. The fourth and fifth days were the next most common.

Every case, however, did not relapse. Out of 300 reported, 21 escaped. It is not easy to say how this happened, but such was the case; neither is it easy to say how a third or second relapse should have happened to a certain number, but so it did; 28 cases out of 300 had three attacks of the epidemic fever.

The following tables will show the day on which this took place, and the duration of the attack:—

TABLE showing day of occurrence of third attack or second relapse, in 28 cases out of 300.

No.		Day.
1	relapsed from 1st invasion on	15th
1	- -	16th
1	- -	17th
2	- -	18th
1	- -	19th
3	- -	20th
2	- -	21st
1	- -	22d
1	- -	23d
3	- -	25th
4	- -	30th
1	- -	35th
2	- -	36th
1	- -	37th
2	- -	40th
1	- -	44th
1	- -	48th
—		
28 Total.		

TABLE showing duration of third attack or second relapse, in 28 cases out of 300.

No.		Day.
1	had crisis on the	2d
7	- -	3d
6	- -	4th
0	- -	5th
2	- -	6th
1	- -	7th
8	- -	8th
0	- -	9th
3	- -	10th
—		
28 Total.		

The febrile disease having now arrived at its termination, the patient returns to health by a slow convalescence. It frequently, however, leaves behind it disagreeable and troublesome sequelæ, such as continued rheumatic pain, swelled and painful feet, slight inflammation of the eyes, herpetic eruptions about the mouth, boils on the body, miliary eruptions, enlarged glands, sometimes going on to suppuration, deafness, impaired appetite, and great debility.

Such is a short history of the simple and uncomplicated form of the disease ending in recovery, but it is frequently accompanied by graver symptoms. In the more severe cases, to the symptoms just spoken of, are occasionally added delirium, jaundice, with petechial eruptions, great and complete prostration of strength, and suppression of urine. Besides these the fever is occasionally complicated with chest affections, such as pneumonia and bronchitis, which add much to the danger and duration of the disease. I have seldom witnessed any abdominal affection.

It is observed in the worst cases, that the prostration of strength is greater, even from the commencement of the disease; the tongue appears larger, more flabby, and coated with a peculiar reddish-brown fur, and cracked all over; sordes collect on the teeth; the breath is very offensive; the aspect of the patient is peculiarly anxious and depressed; the surface of the body becomes yellow, either with or without petechiæ; the torpor and lassitude are extreme; low muttering delirium occurs during the night; from the urine being scanty, it becomes totally suppressed; and the patient dies comatose, giving every evidence of a powerful poison circulating in the blood.

From cases of a similar nature occurring in Edinburgh, Professor Henderson was led to suspect that the poison, giving rise to such grave symptoms, was urea,—a poisonous ingredient of the urinary secretion; and Dr Douglas Maclagan, by experiment, has actually detected urea in the fluid of the ventricles, and in the blood of some of Professor Henderson's fever patients. It has also more lately been discovered by the experiments of Mr M. W. Taylor, (Scott. and North of England Medical Gazette, No. 20,) in two cases of fever, both under the care of Professor Henderson.

Abortion in those pregnant, when seized with the epidemic, was almost universal. Only one female escaped it in the cases attended by me. These occurred more frequently during the first attack, as will be seen from the following table:—

TABLE of twenty cases of Abortion, occurring during the course of the Epidemic.

12	aborted during	1st attack
6	- -	2d attack
1	- -	3d attack
1	escaped	
20	Total.	

In females also, occasionally severe menstrual discharges occurred with the invasion of the fever.

Diagnosis of the epidemic.—From the history and course of the epi-

demic just given, the diagnosis appears sufficiently simple and easy; the suddenness of the invasion; the severity of the early symptoms; the quickened pulse; the peculiar, furred, and creamy tongue; the gastric pain; nausea; with the early and decided crisis, followed by articular pains; the almost certainty of a second attack or relapse, after a short but distinct intermission; all tend to point out the existence of the epidemic, and to distinguish it from other fevers.

Considerable controversy exists, however, with regard to the similarity or difference of the epidemic and typhus fever. Drs Alison and Christison are apparently in favour of considering the fevers to be the same disease, although they both admit that some facts made known cannot be explained without considering them different diseases. Drs Craigie and Henderson, on the other hand, consider them as distinct diseases, and these distinctions have already been pointed out by both of these gentlemen in previous numbers of this Journal,—the chief difference consisting in the very quick epidemic pulse; the shorter duration of the attack; the disposition to relapse; the articular pains; the absence of the usual typhoid measly eruption; the less severe affection of the brain and its membranes; and the less fatal nature of the disease; and the liability to abortion in pregnant females. I am not aware that, in Leith, any farther diagnostic character of any consequence has been observed in addition to these mentioned. The general aspect and appearance of the two fevers are, however, so different that it appears strange the two diseases could ever have been supposed the same; and the more we descend from general appearances to the most minute, the dissimilarity becomes more strikingly prominent. I am inclined, therefore, to consider the epidemic, as witnessed in Leith, as a totally different disease from true typhus.

It has been alleged that the cases accompanied by jaundice resemble closely cases of yellow fever, as occurring in the West Indies. But Dr Craigie, in his paper on the Epidemic Fever, in the October Number of this Journal, points out the fallacy of this allegation.

It would appear that this epidemic is not altogether new, as a similar one is described as having prevailed in Dublin in 1806, and at Waterford in 1817. Dr Christison also remarked, (Trans. Med.-Chir. Society, January 1844,) "that in relation to the peculiar characters of the disease, it was not a new one, but had been described by himself as 'synocha,' in his article on Fever in Dr Tweedie's Library of Practical Medicine." He stated also, "that, at the time when he had observed the same fever twenty years ago, it was the general impression that it could produce common typhus, and *vice versa*."

An interesting fact has been brought before the profession by Dr Spittal of Edinburgh, namely, "that the present epidemic seems exactly the same in all its important features as an epidemic described by Hippocrates, as having occurred in the island of Thasus, on the coast of Thrace, showing, in a remarkable manner, how the ame variety of fever has apparently remained unchanged for up-

wards of 2000 years, and continued to manifest itself from time to time."

Prognosis.—The general prognosis of the simple epidemic fever is most favourable; in uncomplicated cases danger is almost never to be apprehended, and recovery may certainly, in general, be predicted.

In the more severe cases, however, especially those combined with jaundice and petechiæ, or complicated with some head, chest, or abdominal affection, and occurring in persons of debilitated constitution, or of an advanced age, the prognosis is much less favourable; and indeed no general one can be given, but we must be guided in our expectation by the severity of particular symptoms.

I believe the mortality of the season has not at all been increased in consequence of the occurrence of the epidemic. The number of deaths from fever, as registered in the parish mortality record, has been only forty-five during the five months of the epidemic.

The mortality was, however, greater in the Leith Fever Hospital, 10 having died out of 216 cases; but it must be remembered that in general the worst cases were sent to the hospital, and few of these ten died simply from fever, but from some other disease occurring with it. Thus one died from meningitis, another from peritonitis; one had carcinoma of the breast, accompanied with bronchitis; and another had severe ulcerated throat from previous disease.

In Glasgow, it has been remarked that a decided greater mortality from the epidemic fever in young patients existed. It has been the contrary here,—only a very few infants have died apparently from the epidemic; but the mothers of those infants have, in general, had fever, and in all likelihood the children died more from the defective and improper nourishment derived from their mothers, than from the influence of the epidemic. It was among the older and infirm that the mortality proved the greatest, and in these death has been produced in four or five days from the invasion of the disease.

REMARKS ON CERTAIN PECULIARITIES OF THE EPIDEMIC.

I have mentioned that the pulse, in an early day of the disease, was as high as 140 to 160. In its character, however, it is never strong, or free and firm, so as to warrant the use of the lancet, but possesses a peculiar tremulous or irregular motion, and in general is soft and compressible, or small and wiry. It is a pulse more like that felt in the diseases of nervously excited individuals, than that observed in fever of a longer and more severe duration. The delirium that occasionally accompanies this quickened pulse is never of a high kind, but generally exists in the form of low muttering delirium, or raving, restlessness, and impatience. It would appear that the great nervous centres of the body are peculiarly implicated in this epidemic fever, both from the extreme rapidity in which the pulse rises at the commencement of the disease, and the equally rapid manner in which it falls at the close of the disease. *Delirium tremens* occurs frequently in those of an intemperate habit, when seized with the epidemic;—indeed few dissipated characters escape it.

The occurrence of yellowness or jaundice with petechial spots has not been a very uncommon occurrence. The yellowness has appeared in 31 cases out of 300, and the petechiæ in 21 out of the same number. In some cases the yellowness occurred alone, in others accompanied by petechiæ, and in a third class the petechiæ occurred alone.

The number of simply yellow cases happened nearly in an equal proportion of cases during the first and second attacks, namely, 14 in the former and 19 in the latter, while 2 cases were yellow during the third attack. Of the 14 cases yellow in the first attack, 3 were accompanied by petechiæ, and of the 19 yellow cases during the second attack, 6 had petechiæ. Both the yellow cases in the third attack had petechiæ. Again, in the first attack, 8 had petechiæ, 3 of which were yellow. In the second attack, 14 had petechiæ, 6 of which were yellow. From this it follows, that, in the first attack, 3 had both yellowness and petechiæ, and in the second 6 had both. The following table will show exactly how these occurred.

Table of the number of Cases of Fever with Yellowness and Petechiæ; number of Cases reported, 300; total, 31 Yellow Cases; 21 with Petechiæ.

No.	1st Attack.		2d Attack.		3d Attack.		Remarks.
	Yellow.	Petechiæ.	Yellow.	Petechiæ.	Yellow.	Petechiæ.	
1	Yellow						
1			Yellow				
1		Petechiæ	Yellow				
1	Yellow						
1		Petechiæ		Petechiæ			
1			Yellow				
1	Yellow	Petechiæ					Died 12th day.
1	Yellow		Yellow				
1			Yellow				
1			Yellow				
1				Petechiæ			
1			Yellow	Petechiæ			
1			Yellow				
1			Yellow				
1			Yellow				
1	Yellow						
1			Yellow				
1					Yellow	Petechiæ	Died 5th day of relapse.
1				Petechiæ			
1	Yellow			Petechiæ			
1		Petechiæ			Yellow	Petechiæ	
1			Yellow				
1			Yellow	Petechiæ			
1			Yellow	Petechiæ			
1			Yellow				
1	Yellow						
1			Yellow	Petechiæ			
1		Petechiæ					

No.	1st Attack.		2d Attack.		3d Attack.		Remarks.
	Yellow.	Petechiæ.	Yellow.	Petechiæ.	Yellow.	Petechiæ.	
1				Petechiæ			
1	Yellow	Petechiæ					
1	Yellow			Petechiæ			
1	Yellow		Yellow				
1		Petechiæ		Petechiæ			
1	Yellow						
1	Yellow			Petechiæ			Died 7th day.
1	Yellow	Petechiæ					
1			Yellow	Petechiæ			
1	Yellow		Yellow	Petechiæ			
38	14	8	19	14	2	2	3

Abstract of the above Table.

1st Attack.—14 cases were yellow and 8 had petechiæ.

Of these, { 11 were simply yellow.
3 yellow with petechiæ.
5 had petechiæ alone.

2d Attack.—19 cases were yellow and 14 had petechiæ.

Of these, { 13 were simply yellow.
6 yellow with petechiæ.
8 had petechiæ alone.

3d Attack.—2 cases were yellow, and the same two had petechiæ, (one of which had petechiæ on the first attack.)

Peculiarities not shown in the Abstract.

2 cases were yellow 1st and 2d attack, without petechiæ.
1 case had petechiæ 1st and 3d attacks, with yellowness the 3d.
3 cases were yellow 1st attack, with petechiæ the 2d.
2 cases had petechiæ 1st and 2d attack, without yellowness.

This yellowness occurred both in the old and in the young. I have seen it at the age of eight years. I think, however, it occurs more frequently about the middle period of life, and in the Fever Hospital it was observed by Mr Small, the house-surgeon, to be more frequent in the month of December. It seldom lasted in ordinary cases above a few days, and generally made its appearance about the third or fourth day from the invasion of the particular attack it occurred in. Besides being characterized by the peculiar colour of the surface, yellowness of the conjunctiva, it was generally accompanied with fulness and tenderness about the epigastrium, a greater degree of lassitude, headach, bad taste in the mouth, continued want of appetite, scanty and high-coloured urine, and dark bilious-looking stools, and occasionally vomiting of bilious matter.

Obstruction of the gall-ducts by viscid bile, and the non-elimination of bile have both been assigned as reasons for this yellowness, but an abundance of bile has been found in jaundiced cases in the duodenum and gall ducts. From my own observations I am inclined to believe that in these jaundiced cases an excess of bile generally exists. In three cases of death from fever, where I had an opportunity of examining the bodies, I found the gall-bladder full of bile, and a considerable quantity in the small intestine, and the ducts

apparently pervious. It would appear, therefore, that absorption of bile into the blood takes place from some unknown cause.

With regard to the occurrence of petechiæ in this form of fever, some controversy as to their origin exists. These petechial spots, like the yellowness, have been observed both in the young and in the old, and frequently in those of a debilitated constitution. In middle life, however, and in the robust, I have not unfrequently seen them. It has been alleged that they arise, in the first instance, from flea-bites, but that in all cases they do not is very evident.

Did they arise from flea-bites, then, among the poor, we would have them much more frequently; but I suspect petechiæ arise very seldom from these bites. I caused two patients, labouring under fever, a male and female, one in the first attack, and the other in the second, to be bit freely by a number of fleas confined in a bottle. These bites went through the ordinary appearance of a flea-bite in a healthy subject, though the fever was severe in both cases. Again, I have seen the arm of a female patient covered with distinct flea-bites when she was in the height of the fever, and had considerable yellowness. These flea-bites maintained their distinct and characteristic appearance, and between them I observed petechial spots appear, differing both in colour, size, and shape, from the flea-bites, — the bites in the meantime gradually fading away. This evidence appears pretty conclusive, though it by no means establishes the point.

It is to be remarked, that the petechiæ observed in the old and in the young have presented a very different appearance. In this epidemic I have not seen a petechial spot in a young subject that was not of a claret colour, and of a defined and distinctly rounded shape; while in the old the colour was of a dark musty purple, with irregular or ragged edges, and in general of a far larger size, sometimes equal to that of a split-pea. That the petechiæ depend upon some peculiar hemorrhagic tendency in a debilitated constitution, would appear pretty obvious from their speedy disappearance under the use of astringent stimuli.

But whatever may be the cause and origin of the yellowness and petechiæ, I do not consider either of them as essential characters of the epidemic, but merely as superadded symptoms.

From the greater disturbance apparently occasioned in the system from the presence of jaundice and petechiæ, the fatal cases have generally presented these appearances.

Treatment.—The treatment required in the milder forms of the disease has been extremely simple,—active purgatives at the commencement, followed by some ordinary febrifuge, as the *Aq. Acet. Ammoniæ* mixture, with *Spt. Ether. Nitrici*, or some saline solution, with the tartrate of antimony, cold to the head, spunging the body, and low diet, has, in general, been sufficient.

Severe headach, where not relieved by epistaxis, has been often removed by a few leeches applied to the temples. The epigastric tenderness and vomiting have, in general, given way under the repeated application of sinapisms to the stomach, and small doses of calomel and opium. Leeches I have seldom found of much service

either in lessening the pain, or in abating the vomiting. In some severe cases of vomiting I have seen the hydrocyanic acid used, and with advantage. Turpentine enemata are also of much service.

I am not aware that the crisis can be hastened by any medicine, and I believe the critical sweating that occurs is totally independent of it. Opiates generally cause restlessness and uneasiness, and seldom produce sleep. Small doses of the *Hydrarg. c. Creta*, and Dover's powder have appeared to relieve the general uneasiness, and tendency to pain. The articular pains supervening upon the fever sometimes resist every remedy; but very severe ones have yielded to repeated small doses of the *Vinum Colchici* and *Sol. Mur. Morphiæ*, in the proportion of about ten drops of each every three or four hours. This remedy it is not safe, however, to use before the crisis, as it invariably produces much gastric irritation, and vomiting of bilious matter. The Dover's powder, too, is of some use in lessening the articular pains.

In the jaundiced cases, calomel and rhubarb, calomel and opium, sinapisms over the region of the liver, seem the most appropriate treatment. But in the treatment of this epidemic, the best method appears to be, after a full and free evacuation of the bowels, proper regulation of the diet and stimulants.

Emetics at the onset of the disease I have never found to prevent the accession, though they certainly seemed to mitigate the severity of it. Tonics have proved useful during convalescence after the danger of the relapse was past. During the intermission they seemed altogether useless, and certainly never had the effect of preventing the occurrence of a second attack.

CONTAGIOUS NATURE OF THE EPIDEMIC.

The epidemic fever, as observed in Leith, has proved itself to be decidedly infectious and contagious,—cases confirmative of this continually occurred. At one time a single visit to an infected person proved sufficient to create the disease, while at other times long and continued exposure was necessary.

Apparently some peculiarity which confined the fever to certain localities existed. It was curious to observe the number of cases in three different closes, within a few yards of each other, and all running in the same direction. The class of inhabitants in the one were certainly a degree worse than in the others, and this seemed to be the only cause of difference. In the one, I believe not a single individual escaped from the fever; in another, a small portion were only taken ill; and in the third a few, and those few the most destitute in it.

The disputed question as to the nature of this epidemic, allowing it to be the same as that prevalent in Edinburgh, in relation to typhous fever, is one of considerable interest. The distinctions between the two diseases have already been ably pointed out; but from the occasional occurrence of the measly typhoid eruption in cases of the epidemic fever, it has been suggested that the two fevers arise from the same source, or, in fact, the one is a modification of the other.

I have been favoured with the following particulars of a case, as

occurring in Leith, which certainly goes to prove the two different fevers, as arising from the same poison. A tailor in Leith had two men in his employment, when a third came to his shop from Edinburgh. This Edinburgh man's wife was ill at the time with the epidemic, as it prevailed in that city. The man himself was only shortly recovered from a first attack, and he had been at his employment but a few days, when he was taken ill of the relapse, or second attack. In a few days after this, both the other two men took fever,—the one had a regular attack of typhus, characterized by measly eruption, and protracted crisis, without relapse, while the other man had the usual epidemic fever, with its peculiar symptoms. The most particular investigation was made to trace another source of infection, but without success.

In the Leith Fever Hospital, upwards of 200 cases have been admitted, and in two only has the measly eruption been seen. The first case was that of Thomas Christie, aged 6, from Brickwork Close, under Dr Watson. The whole of the family from which this boy had been removed, had the usual epidemic. On the second day from admission, the apparently true typhoid measly eruption appeared, and lasted for three or four days. He had all the symptoms of the epidemic; crisis occurred on the fifth day; the relapse on the eleventh, followed by the usual articular pains.* The other was that of a young girl, but she had been brought from a house in the Kirkgate, where continued fever was, and she herself had the same species of fever, not the usual epidemic.

Such cases as these are extremely interesting, and certainly give strong grounds for reasoning on the similarity of the typhus fever and the epidemic fever; but it has been affirmed, upon good authority, (Trans. Med.-Chirurg. Society in Monthly Journal, No. xxxviii. page 181), that this measly eruption occasionally occurs in other fevers than typhus, and if so, why not in this epidemic, as well as another, without converting it into typhus?

Such cases are, however, so rare, that I cannot but look upon them as accidental, or rather, irregular occurrences, and not usually belonging to the true character of the epidemic fever. In upwards of 800 cases which have come under my notice, I am not aware of seeing the measly eruption in a single instance of the epidemic, and I believe it has been nearly as scarce in the practice of others.

It is a question worthy of some little consideration to inquire whether cases of fever, presenting in the first place all the usual characters of the epidemic, ever degenerate into typhus. I have little doubt that they do. In a case which occurred in Vinegar Close, where a small room was inhabited by three females, the daughter, aged 21, went through the usual form of the epidemic; a young woman, a lodger, did the same; both relapsed. When the mother was taken ill, she had no measly eruption, and for a few days presented the ordinary symptoms of the fever as it had occurred to the other two inmates of the house. Soon, however, the symp-

* This case bears a resemblance to the one mentioned by Dr Cormack, of Mary Wallace, and also to one reported by Dr William Robertson of Edinburgh, of Betsy Gibb. (Vide January and February Nos. of Monthly Journal.)

toms, instead of abating, increased. Day by day she became more typhoid; sordes collected on the teeth; the tongue was black and dry; petechiæ appeared on the body; there was low muttering delirium; the pulse required large stimuli; and, in short, she had all the aggravated symptoms such as I have been accustomed to see in undoubted typhus. The amendment did not take place till about the twentieth day; the convalescence was slow and protracted, and no relapse occurred.

Another case, presenting typhoid symptoms, and ending fatally in the midst of the epidemic fever, I may mention. During the early period of the epidemic, I attended for an attack-fit a young girl, one of a large family, all residing in a single room in King Street. Subsequently four or five of the children took the epidemic, and went through its usual course. Several cases of the same epidemic fever existed in the neighbourhood, but none of typhus. The mother of the family I speak of, (Mrs Dickson, aged 30,) before the crisis of the second attack of some of her children, took fever herself. She was in the seventh month of her pregnancy. No measly eruption was present, and except a greater degree of sickness and vomiting, all the symptoms of the first few days were favourable, and strikingly similar to the other cases. Upon the fourth day, however, she got much worse; delirium came on; petechiæ appeared in numerous and large spots; the vomiting was severe, and the ejected matter was of a dark colour. On the sixth day all the symptoms were much aggravated; the delirium increased; picking at the bed-clothes; vomiting of black hare-soup like matter occurred; stupor came on, with suppression of urine, and she died comatose on the ninth day without miscarrying. The husband immediately after took fever, lying on the same bed on which his wife had died. He went through the usual course of the epidemic, with an early crisis, relapse, and articular pains.

I am in possession of notes of a case where a man had two distinct attacks of the epidemic fever, or attack and relapse, and immediately after he took true typhus, characterized by the measly eruption and other symptoms.

My object being merely to state facts as I have observed them, I shall indulge in no theoretical deductions; but from what has been said, it appears evident, in the *first* place, that the epidemic fever, as it has appeared in Leith, has presented in so large an amount of cases, characters so peculiar and so uniform as to entitle it to be distinguished as a fever *sui generis*. In the *second* place, that the measly eruption, characteristic of true typhus, has been observed in a few cases of fever—presenting all the symptoms and stages of the epidemic fever. In the *third* place, that cases of the epidemic fever (having no measly eruption) have degenerated, or taken on, all the later characters usually observed in true typhus. And in the *fourth* and *last* place, that a distinct attack of the epidemic fever has been followed in the same person in the course of a few days, by true typhus, characterized by measly eruption, and other usual appearances observed in that fever.

PART II.

CRITICAL ANALYSIS.

ART. I.—*A Treatise on Food and Diet; with Observations on the Dietetical Regimen suited for disordered states of the Digestive Organs; and an Account of the Dietaries of some of the principal Metropolitan and other Establishments for Paupers, Lunatics, Criminals, Children, the Sick, &c.* By JONATHAN PEREIRA, M. D., F. R. S., and L. S., &c. &c. London, 1843, Pp. 542.

THE immense strides which chemistry has made of late years, and the important light which its results have thrown on every branch of disease, are in none more conspicuous than in the new aspect which it has caused men of science to regard the articles of diet. Knowledge is progressive; and the present enlightened views which Liebig, Dumas, Peyer, and Boussingault have had the honour of promulgating in reference to the chemistry of assimilation and nutrition are only another progressive step beyond that important one which Dr Prout previously laid.

Dr Pereira's Treatise on Food and Diet is the first which has appeared in the English language embodying the researches and enlightened views of these late inquirers. He has, consequently, been induced to abandon the old division of articles of diet according as one or other proximate principle predominated, and has, as he informs us in his Preface, adopted so far Tiedemann's arrangement, on which, however, he has made some improvements. This may be required in the present state of our knowledge relative to the chemical constitution of alimentary matters, but it does seem a fault in all modern arrangements, in every department of science, to divide and subdivide beyond what is necessary for clear arrangement. We were induced to make this remark in consequence of Dr Pereira dividing his alimentary principles into twelve sections, instead of the beautifully simple one of Dr Prout, who included all under four,—the aqueous, saccharine, albuminous, and oleaginous,—a division which might have been considered as perfect, had another division, the saline, been added.

Dr Pereira's treatise is divided into two great sections,—food and diet. The first includes the chemical and proximate elements of food, and the compound aliments which these proximate elements form, treated under the three heads, solid aliments, liquid aliments, and condiments. The second part treats of the digestibility of food, nutritive qualities of food, time of eating, dietaries, and dietetical regimen suited for disordered states of the digestive organs.

The chemical elements of food, which also occur in organized living bodies, are eighteen in number; but of these only thirteen are essential constituents of the human body. These are, carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, iron, chlorine, sodium, calcium, potassium, magnesia, and fluorine.

Carbon exists in almost every alimentary substance, but in different proportions in different articles of food. Thus, in fats and oils it composes about 78 per cent. of the weight; it forms about 55 per cent. of fibrine, albumen, casein, and gluten, and varies from 46 to 50 per cent. in the different grains. It is by the union of carbon with oxygen that the animal heat is supposed to be chiefly kept up; and M. Liebig states that an adult with moderate exercise consumes about $15\frac{3}{10}$ ounces avoirdupois of carbon daily. In confinement and in ordinary life, however, the proportion is probably considerably lower, and facts are stated which make it probable that the average daily consumpt of carbon does not exceed 10 ounces.

Dr Pereira appears to agree with Liebig that starch and sugar may be converted into fat by the animal system, and thus furnish a certain amount of oxygen independent of the atmosphere. This, however, seems a very improbable supposition, and one which the experiments of Bouchardat and Sandras on digestion do not appear to warrant. These experimentalists found, that when sugar and starch were administered to a living animal they disappeared from the stomach in the form of lactic or acetic acid,—none were thrown into the circulation in an undecomposed state. Now, when we reflect that the chemical elements are in the exact proportion in sugar and starch to form water and carbon, and that in lactic acid they are in the very same proportion, it is much more likely that the acetic acid once formed will be decomposed at the lungs in the usual way, its carbon uniting with the oxygen of the atmosphere, and the elements of water uniting to form that fluid. Bouchardat and Sandras also found, in reference to fatty matters, that they passed the stomach, and, forming in the intestines an emulsion with the bile, were taken up by the lacteals and thrown unchanged into the circulation. From these experiments it seems more than probable that fat is not generally, if ever, formed from sugar or starch as Liebig supposes; nor is there any necessity for

supposing that such should be the case, seeing that the researches of chemists have now proved that alimentary substances, supposed by Liebig to contain no fatty matters, actually contain from 4 to 10 per cent.

When afterwards speaking on the same subject, Dr Pereira adduces from Liebig the instance considered by him as most in favour of the idea that sugar and starch may be converted into fat. A lean goose, weighing 4 pounds, gained in 36 days, during which it was fed with 24 pounds of maize, 5 pounds in weight, and yielded 3½ pounds of fat. Now Liebig assumed that maize "does not contain the thousandth part of its weight of fat, or of any substance resembling fat." But this statement results from an imperfect knowledge of the constitution of maize. Some American chemists have found 10 and 12 per cent. of fatty matter, and Professor Johnston finds the amount of fatty matter varies from 5 to 10 per cent. The above experiment, therefore, proves the very reverse of that for which it is adduced to prove, for it proves that the whole fat was derived from the fatty matter previously existing in the maize which the animal consumed.

Hydrogen exists in articles of food in three proportions: 1*st*, in which the hydrogen and oxygen of the substance are in such proportions as to form water; 2*d*, in which hydrogen is in excess; and 3*d*, in which hydrogen is deficient. Starch, cane sugar, grape sugar, and milk sugar, gum, and acetic acid belong to the first class; fat, alcohol, albumen, fibrin, casein, gelatinous tissues, &c. belong to the second; and pectic, citric and tartaric acids, to the third division.

Oxygen, however, is perhaps the most interesting of all the chemical elements of food. It is concerned in every change which occurs among natural bodies; without its vitalizing influence life would cease. Oxygen is a necessary ingredient of our food, and is calculated by Dr Pereira to constitute not less than three-fourths of the known terraqueous globe. As the carbon and hydrogen of the food are, for the most part, thrown out of the system in combination with oxygen, those foods which contain a smaller quantity of oxygen must consume a greater amount from the atmosphere. Hence, it happens the kind of food influences the activity of the function of respiration. It has been found by those who descended in diving bells, that they consumed a larger amount of air when they lived on animal food and spirituous liquors, than when they partook of vegetable food and water.

Nitrogen is an essential constituent of every animal texture, but is not present in all articles of diet. It, however, forms an essential portion of the food which nature supplies to the young animal, being contained in the albumen of the egg and in the casein of milk. Recent writers have been led to conclude that ni-

trogenized foods are alone capable of being converted into blood and contributing to the formation of the animal tissues. Liebig hence called them plastic elements of nutrition. The non-nitrogenized foods are regarded as contributing solely to the support of the respiratory function, and have hence been denominated elements of respiration. Dr Pereira, in an able commentary on Liebig's reasonings regarding the non-absorption of nitrogen from the air, shows that, instead of this being a settled point in favour of Liebig's views, it is a point not proved, or rather, is against that chemist's theory; and, it is to be recollected, that that able observer, Dr Prout, considers that both sugar and fat are convertible, in the system, into nitrogenized animal substances. The author also shows that no conclusions can be drawn from the fact of non-nitrogenized substances being incapable of supporting life for a continued length of time, because the very same is true of the most highly nitrogenized substances with which we are acquainted; even fibrin, albumen, and gelatin, when taken separately, allowing the animal to die of actual starvation. Additional evidence of the same point is found in the fact proved by Dr Ure, that when benzoic acid is taken into the stomach it appears in the urine in the form of hippuric acid. This shows that non-nitrogenous substances may assume azote within the system and form nitrogenized compounds. A stray fact on the same side of the question, though one not adduced by Dr Pereira, is the acknowledged efficacy of the administration of ammonia in diabetes. Under its administration the saccharine matter notably diminishes in quantity, and all the symptoms improve. Here also the nitrogen of the ammonia appears to unite with the saccharine matters, and convert them into nitrogenized compounds fit for the nourishment of the body.

Since the attention of chemists has been drawn to the quantity of nitrogen in food, they have endeavoured to construct tables showing the proportional amount of nutritious matter contained in each variety of food. Dr Pereira quotes Boussingault's table of nutritive equivalents constructed on this principle. Such tables, however interesting, are by no means possessed of that value which the constructors of them imagine. The mere supply of nitrogenous elements will not supply the wants of the system even for its repair; for exclusive of carbon for respiration, the system requires phosphate of lime, muriate of soda, iron, and many other inorganic matters, to which ought also to be added fat. Any table, then, constructed on the principle of reckoning the nutritive qualities of food, according to the amount of one principle only in it, must be defective, seeing that carbonaceous and nitrogenous as well as earthy and saline matters, are as imperiously required for the purposes of nutrition as nitrogen itself.

Phosphorus is found in both animals and vegetables, and is introduced into the system with our food. It is remarked that fishes are especially rich in phosphorus, but the exact state in which it exists in albumen or fibrin is unknown. The chief use of phosphorus in the animal economy is for the formation of phosphate of lime for the consolidation of the bones. Phosphorus also exists in the brain in considerable quantity.

Sulphur probably exists in a free state in albumen and fibrin. It is a constituent of both vegetables and animals. The sulphuretted hydrogen, generated in the decomposition of vegetable and animal substances, shows the presence of sulphur in these bodies. The animal excretions contain sulphur, either free or in union with oxygen, forming various sulphates.

Iron is found in the ashes of animal and vegetable matters; but the exact state in which it occurs in the animal body is not known. This metal is an essential constituent of the blood globules, and the beneficial effect of chalybeates in anæmia favours the idea that the colour of the blood depends in some degree on the amount of iron in it. Denis found blood to contain from 0.128 to 0.346 per thousand of sesquioxide of iron. Liebig, however, for the sake of his theory, assumes the quantity of iron to be very much larger, and never quotes Denis as one of his authorities for the statement. Liebig's view relative to the iron in the blood is, that the iron in the arterial blood is saturated with oxygen, and forms a hydrated sesquioxide. During its passage throughout the capillaries it loses part of the oxygen and becomes protoxide of iron, which unites with carbonic acid,—one of the products of the metamorphosed tissues,—and thus forms carbonate of the protoxide of iron, which, he says, is found in venous blood. Dr Pereira justly remarks, as an objection to this theory being the correct one, that, for every volume of oxygen absorbed by carbonate of the protoxide of iron, no less than four volumes of carbonic acid are evolved; whereas experiments on respiration have clearly proved that carbonic acid is evolved in nearly equal proportion to the oxygen consumed. The simplest mode, however, of showing that Liebig's theory fails to explain the phenomena of respiration, is to consider where the animal heat would be evolved according to his theory. The chemical changes by which oxygen unites with the carbon of the food or tissues is, according to Liebig, in the capillaries over the whole body and not at the lungs. If this were the case, the venous blood which returns from these capillaries would be several degrees of temperature warmer than the blood which arrives there through the arteries. In other words, the venous blood returned to the heart would be warmer than the arterial blood which leaves it. No fact in physiology, however, is better established than this, that the arterial blood is warmer

than the venous—a fact which proves that the increased temperature which the blood acquires from the conversion of carbon into carbonic acid, occurs at the lungs and not at the extremities of the capillary circulation. The effects of sulphuretted hydrogen and of prussic acid, when inhaled, would act more deleteriously did the essential changes take place at the lungs, than if at the extreme capillaries; so that their effects, instanced by Liebig as corroborating his views of respiration, are, in fact, more in accordance with the already proved facts of the essential changes taking place at the lungs.

Chlorine and soda are found as constituents of the blood and most of the secretions. These two substances seem to be chiefly derived from the chloride of sodium. The chlorine, in the form of hydrochloric acid, is a necessary ingredient of the gastric juice. The system seems to possess the power of separating the hydrochloric acid from the soda, secreting the one with the gastric juice, and the other with the bile.

Calcium exists in animals chiefly in the form of a subphosphate of lime, but in the invertebrated animals it consists chiefly of a carbonate of lime. All the animal solids and the blood contain lime. It exists also in the albumen and yolk of the egg, and from this source the lime for the formation of the skeleton of the chick appears to be derived. Dr Prout, however, seems to imagine that the recent egg contains no lime excepting in its shell, and that the lime for the bones of the chick must be derived from that source, or from transmutation of other principles. Almost all articles of food yield some amount of lime, as well as the common waters. Magnesium and potassium exist in the animal body in very small proportions, and the existence of fluorine in the bones and teeth of animals has even been denied by Dr Rees.

In considering the alimentary principles, Dr Pereira, as above stated, leaves the simple arrangement of Dr Prout, and treats of them under the 12 heads, 1. aqueous; 2. mucilaginous or gummy; 3. saccharine; 4. amylaceous; 5. ligneous; 6. pectinaceous; 7. acidulous; 8. alcoholic; 9. oily or fatty; 10. proteinaceous; 11. gelatinous; and 12. saline.

Much important information is given relative to the first of these,—the different kinds of water. Water constitutes about 75 per cent. of the human body, and is more necessary to our existence than solid food; in fact, as Dr Pereira justly remarks, it holds an intermediate rank between air and solid food, being less essential than the first, but more so than the last. It has not yet been satisfactorily demonstrated that water is decomposed by the system so as to yield its elements for the formation of the tissues, but in the process of respiration and nutrition water is formed by the animal system. For the particulars regarding the different

kinds of water, and their advantages and disadvantages, we must refer to the work itself; indeed this chapter contains one of the best epitomes with which we are acquainted of the present state of knowledge on this important subject. The author subjoins a list of the tests for the usual impurities in common water, and the mode of using them, and has embodied the information contained in the recent researches of Dr Christison on the accidental adulterations of water by lead.

Nothing particular is stated relative to the gummy principles. Interesting tables, however, are given of the proportions of gum in various articles of food, and the proportions of gum, water, and ashes in various gums.

The saccharine principles form an interesting chapter. In addition to stating the proportion of saccharine principles in various kinds of food, and the proportions of carbon and water in each variety of these principles, the author shows that the use of sugar as an aliment is not deleterious to the teeth, as is generally supposed. With Liebig he agrees that sugar, in ordinary digestion, does not generate acid, though how it is removed he does not state. In dyspeptic individuals he thinks it forms lactic acid, because sugar in contact with "a membrane in a state of decomposition out of the body" produces lactic acid and mucilage. Even faulty digestion, however, is a very different thing from decomposition. The experiments of Bouchardat and Sandras appear to have fully proved that sugar is converted at once in the stomach into acetic acid or lactic acid. For this it requires no interchange of elements, but simply to drop one or two equivalents of water. The twelve atoms of carbon, instead of uniting with eleven of water, as they exist in sugar, unite only with nine atoms of water, and the sugar becomes acetic acid; or the twelve of carbon unite with ten of water and form two atoms of lactic acid. Bouchardat and Sandras showed that this change took place in healthy digestion, but that the acid thus formed was immediately removed from the stomach by the veins and thrown directly into the current of the blood. When acid, then, is found in excess in the stomach after a saccharine diet, it is probable that it is caused by the stomach not possessing that healthy power of absorption sufficient to remove the acid as soon as generated.

It seems one of the peculiarities of all the saccharine, gummy, and starchy principles, and one which has not sufficiently attracted the attention of chemists, that the chemical elements exist in the exact proportion to form carbon and water. It is therefore only by dropping one or two equivalents of water that they are enabled, without the action of oxygen, to assume the acid form, whether we consider that to be the lactic or the acetic.

The amylaceous or starchy principle appears to be one of the

most necessary articles of food, without which animals could not exist. In this respect it is unlike sugar, which cannot be used in any considerable quantity for an unlimited period of time. By digestion, says Dr Pereira, starch becomes converted into gum and sugar, the lactic probably becoming absorbed. Dr Pereira does not seem to have been aware of the beautiful and satisfactory experiments of Bouchardat and Sandras, to which we have had occasion more than once to allude. They were published nine months before the publication of Dr Pereira's work, in the Annales des Sciences Naturelles. These able experimentalists proved that sugar, gum, and starch are, in healthy digestion, converted into lactic or acetic acid, and directly removed from the stomach in that form.

The author gives a page of microscopic drawings of the different forms of the varieties of the starchy principles,—a thing much required, on account of the extent to which the adulteration of the more expensive articles is carried. It is the circumstance of this adulteration being more difficultly imitated with potato starch, which has acquired for Tapioca the credit of being a preferable food for infants, and one less liable to produce acidity or indigestion, than even arrow root itself. In our own experience, however, no farinaceous article of diet agrees with nursing infants so well as genuine West India arrow root; it disagrees just in proportion to the extent of its adulteration with potato starch. In enumerating the different forms of amylaceous substances, salep is described as the tubers of a species of Orchis, and the Cachmere salep to a species of Eulophia. It is quite possible that the tubers of Eulophia may occasionally be used as food, but we are inclined to believe that the chief portion of the Oriental salep is obtained from the tubers of a species of ornithogalum, as ascertained by the great Linné. It may not be generally known that these tubers of the ornithogalum form a staple article of food in oriental countries to this day, and in the English translation of the sacred writings are mistranslated pigeons' dung,* (the literal translation of the word ornithogalum,) a circumstance which has led to some ludicrous mistakes.

We regret to observe that no notice is taken of wheat starch as an article of diet. It forms, however, a jelly to the full as nutritious, and agrees in general as well as the best forms of arrow root. One reason, perhaps, for its not being used as an aliment, is its constant employment for stiffening linens. It would afford, however, to the poorer classes a very useful substitute for the more expensive article arrow root.

The Ligneous principle has been included among aliments, because it has been used as such by several northern nations in sea-

* 2. Kings vi. 25. The fourth part of a cab of Doves' dung (sold) for five pieces of silver at the siege of Samaria.

sons of scarcity. In elementary composition, it so far resembles amylaceous matters, that, like them, it is composed of carbon and the elements of water, and is known to be freely formed from them. In fact, it simply contains fewer atoms of water. It has been long known that not only the Laplanders, but several northern tribes of the Russian dominions, in years of scarcity, prepare a bread from the inner bark of the larch. Professor Autenrieth says this is composed entirely of lignin, but that the process to which it is subjected so softens it, that, when boiled in water, it yields a jelly resembling that of wheat starch. It has been of late attempted to be proved, and Dr Pereira is of this opinion, that the nourishing properties of this bread are to be ascribed to the starch which is said to be diffused abundantly through every part of the plant by the autumnal sap. But those who hold this opinion appear to forget that the very process to which this ligneous matter is repeatedly subjected is the most efficacious possible for removing every particle of starch from it. It is repeatedly washed and beaten with stones in water. We had once an opportunity of examining this bread, being favoured with specimens, brought over by a native of Russia. It resembled Cassava biscuits, swelled and dissolved in boiling water, forming a starch-like jelly, in which floated a very few unchanged ligneous particles,—particles which had evidently not been sufficiently bruised. There is, therefore, nothing improbable in the statement we had from our friend, who stated it formed for months the staple article of diet of the poor classes in many parts of Russia; and we have, besides, the evidence afforded us of many larvæ of insects subsisting solely on this ligneous principle,—their digestive apparatus being formed for the assimilation of this to man indigestible matter. It is, in fact, almost proved that the processes to which lignin is subjected by the northern tribes, reconverts it into the amylaceous principle,—that principle from which it had itself been formed.

Some Dutch chemists have lately proved that two principles exist in lignin; one soluble in potash, the other not. They thus corroborate the researches of the Rev. J. B. Reade, published in the 9th volume of the London and Edinburgh Philosophical Magazine, and which had till now been doubted by all chemists. Ligneous fibre generally passes through the body unchanged; hence its use in dyspeptics and others troubled with constipation. The mechanical excitement of the indigestible matters forms a useful and safe stimulant to the action of the bowels.

Under the head pectinaceous alimentary principle, Dr Pereira includes pectine and pectic acid, as well as that vegeto-gelatinous substance carrageen, procured from some sea-weeds. These substances contain no nitrogen, according to the more recent analysis, though this is to be doubted relatively to carrageen, as, when

burned, it yields some ammonia. Sugar promotes the solidification of both pectine and pectic acid, and this property is taken advantage of in the manufacture of fruit-jellies, &c. These principles are supposed to be alimentary as much as sugar or starch. Their excess of oxygen, however, may prove useful in diminishing the activity of the function of respiration.

Dr Pereira admits the existence of an acidulous alimentary principle for two reasons; *first*, that vegetable acids constitute one of the ingredients of our food; and *second*, that the employment of vegetable acid as an aliment, is necessary for the preservation of our health. The chief reason given for this last assertion is, that Dr Budd states that a prolonged abstinence from succulent vegetables or fruits is the cause of scurvy, and that lemon juice is an antidote for that complaint. We are far from thinking that this is proved. Scurvy has made its appearance during the most liberal use of lemon juice, and it does not appear among northern tribes, who live almost entirely on animal food, and whose only vegetable food is a little barley. Besides antiscorbutic properties have never been ascribed to any vegetable acid but the citric, and not even to it—only to the juice of the lemon itself. The facts stated relative to the acetic, citric, tartaric, &c. acids merit attention.

The alcoholic principle forms the author's eighth division of alimentary principles. It forms a curious and instructive chapter, from the amount of information condensed in it; but its contents need not be particularized here. In it will be found a good short account of the different kinds of alcoholic liquors at present in use, the beers and wines excepted, which form a separate chapter towards the end of the work.

Both the fixed and volatile oils are included under the oily principle. Tables are given of the proportion of fatty matters in various alimentary substances, and also of the elementary composition of a few of their oily matters. From this last table it would appear we are still in want of good analyses of these matters. Many interesting details are given of the probable mode in which these matters are digested, and the conclusions arrived at come very near those which have lately been proved to be the correct ones by Bouchardat and Sandras. These experimenters showed that fats do not undergo digestion in the stomach, but are simply melted and mixed with the chymous mass in the form of minute globules. It is in the duodenum, after mixing with the bile, that these fatty matters seem to form a true emulsion with the alkali of the bile, and in this state are taken up by the lacteals and thrown into the circulation. It is the oily emulsion which gives the white colour to the lacteal fluid.

The proteinaceous principles, or those of which protein forms

the base, are perhaps the most important of the alimentary principles. This, with the gelatinous principle, formed the albuminous principle of Dr Prout. The nitrogenized principle, which forms the basis of fibrin, albumen, casein, in animal substances, and of vegetable gluten, casein and albumen, has been termed by Mulder, *Proteine.* This substance, however, does not exist in a pure state in any of these substances, but in combination with phosphorus, potash, soda, lime, &c. Chemists have thought proper to consider the nitrogenous base of gelatin as not composed of the same basis as that of albumen, fibrin, and casein, but we have seen no solid grounds for such a belief. The actual amount of carbon, hydrogen, nitrogen and oxygen, obtained in the different analyses of the gelatinous principles, do not differ more from those obtained in analysing fibrin or albumen, than different analyses of these last substances differ from one another. No dependence can be placed on the atomic constitution of these substances as deduced from the experiments, for while Mulder states the atomic constitution of protein to be C 40, H 31, N 5, and O 12, Liebig states it as C 48, H 36, N 6, and O 14; but the actual mean of all Mulder's experiments published in the Annalen der Pharmacie, and those which agree most clearly with the atomic weight of fibrin or protein are, C 45, H 38, N 6½, and O 15. This formula gives as the per centage of the different elements, carbon, 52.03; hydrogen, 7.32; nitrogen, 17.53; oxygen, 23.12—numbers which agree so very closely with the more recent results of Scherer's analysis of gelatin, that we are forced to consider the gelatinous and albuminous principles as composed of the same base. Scherer's analysis of gelatin gave as a mean, carbon, 50.573; hydrogen, 7.141; nitrogen, 18.458; oxygen, 23.538.

But the identity of the animal base of these matters is not to be deduced from the experiments of the German chemists alone. MM. Dumas and Cahours succeeded in detecting a fallacy in the researches of Liebig and Mulder. They, from separating more completely the oily and other matters with which these substances are always associated, found that in fibrin, albumen, and casein, both animal and vegetable, the quantity of carbon was somewhat less than had been represented by the German chemists, and of course the per centage of the other elements was somewhat greater. The mean of their extensive series of experiments gave in 100 parts of these substances, carbon, 50.9; hydrogen, 6.5; nitrogen, 18.5; oxygen, 24.1; proportions almost identical with those of Scherer for gelatin. But this is not all. They also analyzed gelatin, and found it to be composed of the very same proportion of elements as the fibrinous or albuminous substances, viz. in 100 parts of carbon, 50.99; hydrogen, 7.07; nitrogen, 18.72, and oxygen, 23.22. It thus appears to be proved that the whole nitrogenized substances

of the animal and vegetable kingdom possess as a base a matter having the same elementary composition; and it is reasonable to infer, that chemists have allowed themselves to be deceived in reference to gelatin, from not attending to the fact, that, when gelatinous tissues are immersed in *aqua potassæ*, they give out free ammonia. This fact at once accounts for the increased quantity of azote which chemists have found in these tissues, and it also proves, that, instead of that azote belonging to the organic matter itself, it belonged to an ammoniacal salt present in the tissue. It may be noticed that in this country Dr Stark, in January 1842, asserted the identity of the animal matter which forms the basis of fibrin, albumen, casein, and gelatin.*

From these remarks it will be apparent, that there is no ground for the division of alimentary principles into the proteinaceous and gelatinous, but that the two ought to have been brought under one head, as had been so wisely done by Dr Prout. It is no argument as to the identity or non-identity, that gelatinous substances will not nourish the body; fibrin, albumen, and casein, given in a pure state, will no more do so than gelatin itself; and, if the theories of Liebig have given an additional stimulus to the physiology of chemistry, they have done much harm by his rashly adopting as facts what in many cases are simply his own preconceived and often unfounded theories.

The various proteinaceous aliments, fibrin, albumen, and casein of the animal kingdom, and the analogous products in the vegetable kingdom are separately commented on by Pereira. Much valuable information is given on each head, and under gluten is given an interesting table of the quantity of gluten in the different grains and roots in common use as food.

After the remarks we made on the proteinaceous alimentary matters, it seems unnecessary to waste space and time on the gelatinous principle, or in showing that which have been regarded as distinct varieties of that principle are probably, in elementary composition, really the same. M. Vogel very recently endeavoured to ascertain in what chondrin differed from gelatin, and after a very patient investigation, found that the only difference he was able to detect was, that gelatin contained a trifling greater proportion of inorganic matter, chiefly phosphate of lime. Under the article isinglass are given many curious facts relative to the varieties of that article, their different commercial values, and the countries whence they come.

The saline forms the twelfth and last class of alimentary principles in Dr Pereira's arrangement. It includes the chloride of sodium, earthy phosphates, salts of potash, and ferruginous compounds. The addition of this class is a decided improvement in

* Proceedings of the Royal Society of Edinburgh, 1841–42, p. 353.

the arrangement of alimentary substances. They are essential constituents of the animal tissues, and without a due supply of them health and vitality cannot be maintained.

The next part of the author's work treats of compound aliments, or foods which consist of two or more alimentary principles. These are conveniently divided into three kinds; 1. Solid aliments, or aliments proper, as beef, bread, &c.; 2. Liquid aliments, or drinks, as wine, beer, tea, &c.; and 3. Condiments, or Seasoning Agents.

As we have had occasion so recently to notice two treatises on food, those of Drs Davidson and Truman, (Vol. lix. p. 400), it seems unnecessary to enter at any length into this part of the subject; as what we have already noticed of Dr Pereira's work is that which especially characterizes it and give it its chief value.

Relative to the animal foods, it may be remarked that the author has enriched his work with the most recent information relative to their proximate composition, their digestibility, under which head he quotes largely from the interesting experiments of Beaumont, their powers of nutrition, &c. Milk is included under the solid aliments, on account of the large proportion of solid matter it contains, and the circumstance of its forming the sole food of the young of the mammalia for a certain time after birth.

The solid animal foods are conveniently classified according as they are obtained from the mammalia, birds, reptiles, fishes, mollusca, &c. On each of these heads much valuable information is given, and well deserves a careful perusal. In a note on the oyster, the author quotes Sir Charles Bell, as to the mode in which these shell-fish lie in their native beds in the ocean, viz. with their flat sides uppermost. This is a mistake. The genera ostrea, pecten, annomia, &c. all lie in their native beds with their flat sides undermost. In many instances, indeed, their lower flat thin shell is attached to the solid rock or stones on which they lie, and in consequence of this secure position, the under or flat valve of all these shell-fish is much thinner than the upper concave valve. This is remarkably so in some genera, but is also very visible in the common oyster. The fishmongers have learnt by experience, that to lay the shell-fish on its flat surface, would be to allow the water contained in the shell to escape and the animal to die, and therefore they expose them on their backs; but this is never the position the fish assumes in its native element.

Vegetable foods are conveniently arranged in two classes, according as they are derived from flowering (or phenogamous) plants, and from flowerless (or cryptogamic) plants. Instead of following a strictly natural arrangement in the subdivision of these two classes, the author arranges food according to the part of the plant used; 1. seeds; 2. fleshy fruits; 3. roots, subterraneous stems

and tubers; 4. buds and young shoots; 5. leaves, leaf-stalks, and flowers; 6. receptacles and ducts; and 7. stems. The cryptogamic plants used as food are in the four natural divisions of ferns, lichens, algæ, and fungi.

In mentioning the preparation of wheat, Dr Pereira mentions a fact which is certainly unknown to naturalists, that the manna croup of the shops is prepared from wheat. His information on this subject is the best that can be had as to the fact, being from a manufacturer of the article. But all works on natural history which take notice of manna croup, describe it as a preparation of the seeds of the *Poa fluitans*, and no doubt it originally was so; but, like other articles, is imitated by a granular preparation of wheat. The author has been at much pains to ascertain the composition of many of the patent farinaceous foods for children and invalids. Thus he has ascertained that semolina, soujee, and manna croup, are manufactured in London from the finest Kentish wheat; Hard's farinaceous food for infants, from the finest wheat only; Densham's farinaceous food, a mixture of three parts wheat flour, and one part barley meal. These last two are subjected to a considerable amount of heat, which modifies the nature of the preparation. Bright's nutritious farina and "Indian corn starch" are potato starch, &c. Polenta is the meal of Indian corn or maize.

Much valuable information is given on the different kinds of bread. Indeed this chapter is one of the most valuable in the whole work, containing as it does the best account in our language of the varieties of bread, their composition, nutritive powers, digestibility, and fitness for invalids.

The Jerusalem artichoke, which the author might have stated, was so termed from its French name Girasole, is described as being used on the continent as a substitute for the potato. We know not on what authority this statement is made, but can speak pretty positively as to the fact of its being the parsnip and not this tuber which formed the substitute for the potato both in France and Germany till very recently. Even in our own country, indeed, the parsnip was the root in common use till driven out by the potato, and the circumstance of its being so well known as a dry choking kind of food requiring butter to facilitate its digestion, gave rise to the proverb, "Fine words butter no parsnips." In all Roman Catholic countries to this day it forms one of the staple dishes, and is never wanting on meagre days when fish is the only animal food.

Much valuable information is given relative to the potato as an article of food. Calculating the proportion of nitrogen in it, it would appear that butcher-meat is just ten and a half times as nutritive as this root. From some extracts on prison diet given by the author, it would appear that six pounds of potatoes per day

were sufficient not only for keeping in health, but also increasing in weight men and boys submitted to its use. This proportion of potatoes would be equal in nutritive power to only nine ounces of butcher meat, according to Liebig's and Boussingault's plan of measuring the nutritive power by the quantity of nitrogen; but we can at once perceive that five or six times that amount of butcher meat per day would not have supplied the wastes of the body nearly so well as the potatoes. The potato has been found a valuable antiscorbutic, inasmuch as scurvy has disappeared from many prisons and penitentiaries since its introduction as an article of diet, without the amount of food being in any respect increased. From the statements of Dr Pereira it would appear that old potatoes contain a lesser proportion of nitrogen than new ones; but Professor Johnston seems to have arrived at a different result, seeing that, in his proportional tables, he calculates the old potato as containing nearly twice the proportion of nitrogen of the new potato.

Neither previous writers nor the author seem to have noticed a remarkable change which takes place occasionally in the potato when they heat after having been frosted. This is the conversion of the whole potato into a substance resembling gum. When the potato is dried after this treatment it presents the feature and appearance of dark cherry gum, woody fibre as well as starchy matter seeming to have undergone the same change. We have more than once had occasion to notice this circumstance, so that it is rather remarkable it has not yet been examined into by chemists.

The liquid aliments, or drinks, are subdivided into six classes:—1. Mucilaginous, farinaceous, or saccharine drinks; 2. Aromatic or astringent drinks; 3. Acidulous drinks; 4. Animal broths, or drinks containing gelatin and osmazome; 5. Emulsive or milky drinks; 6. Alcoholic and other intoxicating drinks.

The author does not express any opinion as to whether the black and green teas are from the same or different species of tea-plant. The late researches into their history, and in particular the cultivation and preparation of the tea in Assam, seem to have decided the question, and to have proved that Decandolle was right in referring them to one species. In Assam the first tea produced was entirely green, as the Chinese labourers whom the government got first over only prepared green tea; but now other kinds are prepared from the same leaves—the difference in the preparation of the leaves producing the difference in colour and effects. Liebig has asserted that the active principle of coffee and tea contributes to the formation of bile. If this matter should absorb nine equivalents of oxygen and nine of water it would form two equivalents of taurin, the nitrogenized compound peculiar to the bile. These

hypothetical views remind us much of a work published the other day by the Professor of Agriculture in the Edinburgh University, in which he endeavours to prove that all substances may be formed of carbon, hydrogen, and oxygen; and the mode he adopts of proving his point is, to add as many atoms of each as will bring the substance to its deduced chemical equivalent. A natural question to the statement made by Liebig, is how bile was prepared in the human body before coffee or tea were in use, and how it is prepared in the systems of those nations who use neither of these articles?

The author, after mentioning the antisoporific effects of tea, states that a strong infusion may be used as an antisoporific, to counteract the effects of opium and intoxicating liquors. We were not aware that tea had ever been made use of for such a purpose, and from its known effects on many constitutions, in producing tremors, anxiety, palpitations, &c., should be inclined to doubt its being an antidote for opium. Coffee, on the other hand, scarcely seems to lessen the disposition to sleep, though the author mentions this as one of its effects; but it most powerfully counteracts the narcotic powers of opium, as we have had occasion repeatedly to ascertain, without giving rise to any deleterious action. No notice is taken of the asserted baneful effects of coffee in giving rise to *fluor albus* in those women who habitually make use of it; yet many French physicians have asserted, that, from the habitual use of *café au lait* in France, more than three-fourths of the women are afflicted with that complaint.

Under the title of acidulous drinks, the author includes soda-water, ginger beer, &c., the carbonic acid present in these beverages causing their briskness and sparkling qualities. Beer the author considers a safe and valuable drink, when used in moderation, and is not of too great strength. The author takes no notice of the effect of beer in promoting the urinary secretion. It is, perhaps, from its action in this way that seamen, whose average allowance in the navy is a gallon per day, are so remarkably free from urinary complaints, but especially from stone. The adulteration of beer, but especially porter, with *Cocculus Indicus*, is alluded to. It is much to be regretted that the Government, in the late alteration of the tariff, did not impose a prohibitory duty on this pernicious drug instead of actually lowering the duty on it. It would be a much more simple plan to prevent its introduction into the country than to prevent its use when in, by imposing a heavy penalty.

Dr Pereira agrees with Dr Christison in thinking that the alcoholic strength of wines has been overrated, and thinks that the strength of ardent spirits has been so also. It has been long asserted that more alcohol may be taken in the form of wine than in that of ardent spirit without producing intoxicating effects. This, how-

ever, would appear to arise entirely from the influence of habit, —the stomach appearing to digest, or the system to throw off, the alcohol most readily in that form in which it has been accustomed to receive it. Thus, though the higher classes, from the constant use of wine, are able to take large quantities of it without pernicious effects, their systems are not equally fortified against ardent spirits; and the converse may every day be witnessed among the lower and middle classes, whose chief strong drink is ardent spirit in some form, but who are readily intoxicated by wine even in small quantity. This fact may explain the reason why connoisseurs in wine assert that a brandied wine is more intoxicating than a non-brandied wine of equal strength. The wine drinker is in this case taking alcohol in a form to which he is not habituated, and suffers the usual effects which would result in his case from drinking brandy. This appears to be a satisfactory enough reason for the fact, without supposing that the alcohol exists in wine in some modified form by which it is prevented from acting so violently on the nervous system. For dietetical purposes Dr Pereira prefers sherry to all the other strong wines; but of the lighter wines claret he thinks the best. The effect of heat in improving Madeira is well known; hence the practice of sending it a voyage to the East Indies. The author attributes this improvement to the heat and agitation. The finest Madeira we certainly ever tasted was that which an eccentric gentleman had attached to the piston of a steam-engine, and kept there for nine months, exposed to a heat varying from 100° to 160° Fahrenheit.

In the second part of Dr Pereira's treatise the author considers the adaptation of aliment to the different wants and conditions of human existence; and, first, of the digestibility of food. On this subject he quotes at large the result of the experiments of Dr Beaumont,—experiments whose value every one must appreciate, and which are continually referred to in all parts of this treatise. Able comments are made on the various circumstances which affect the digestibility of food, as the state of cohesion, tenderness of the fibre, minuteness of division, process of cooking, &c.

In order to arrive at the probable proportion of nutritive matters in various kinds of food, Dr Pereira gives an elaborate table of the various proportions of solid matter and water, of nitrogen and of carbon, in various alimentary substances. A table like this is useful, as affording an approximation to the alimentary powers of various substances; for whether we regard the views of Liebig, as to nitrogenous matters alone, contributing to the increment of the body or not, we know that a certain amount of nitrogenous and carbonaceous matters are required for the wants of the system, and that the value of non-nitrogenized substances is probably in proportion to the quantity of carbon which they contain.

In mentioning the times for eating, and the number of meals per day, the author takes Dr Combe as his chief authority on the subject, and recommends regularity. Breakfast soon after rising; dinner five hours after breakfast; the moderate use of tea or coffee two or three hours after dinner; and supper to those who dine early. When the dinner hour is late luncheon is necessary, but no supper should in this case be taken.

In an economic and political point of view, perhaps the most important part of the present treatise is that which treats of the dietaries for prisons, hospitals, and workhouses, &c. It is known that scurvy, diarrhœa, debility, &c. used formerly to prevail in prisons, &c., but that these evils have now been removed by in some cases, (as in Lewes House of Correction) increasing the amount of diet, and in others (Milbank Penitentiary) by varying the rations, so as to give a certain amount of potatoes weekly.

The author very properly divides this part of his subject into, 1. dietaries for children; 2. for the navy; 3. for the army, and for emigrants; 4. for paupers; 5. for prisoners; 6. for the sick; 7. for the insane; 8. for puerperal women.

In commenting on the diet proper for children, the author seems to have fallen into a strange mistake as to children requiring a larger amount of non-nitrogenized food, in proportion to nitrogenized, than adults. If we take a view of the animal kingdom, we shall see that the very opposite statement is the correct one. Animals, which, in their adult state, live chiefly on non-nitrogenized foods, are furnished by nature with one eminently abounding in nitrogen during the first stage of their existence. It is true that this food, milk, contains a certain amount of non-nitrogenous matter, in the shape of sugar and butter, but from a third to a sixth part of the solid contents of this food consists of nitrogenized aliment. We can easily see the reason of this. Their food requires not only to contain as much nitrogen as will supply the wastes of their system, but also furnish materials for the growth of the tissues. Now we all know that the young of all animals acquire a greater and more rapid development during the time they are living on this milk diet than afterwards. During this period they will double their weight in a much shorter time than after they get to their adult food. And, besides, we see every day the effects of the errors committed in this respect by parents and nurses. Instead of giving that proper mixture of food which shall supply nitrogenized materials for the waste and growth of the tissues, they give this in deficient quantity, but greatly increase the carbonaceous articles beyond what is necessary. The consequence is, the children become remarkably plump, and loaded with fat, but are weak, want vigour, are long in walking, and do not increase in stature like those properly nourished, besides being

more liable to sink under teething, or other disorders to which infants are liable.

The numerous tables of the dietaries for children, the navy, army, paupers, &c. are well worthy of careful study; but it would be almost impossible to give anything like an intelligible abstract of them in this place. According to the results obtained by the Commissioners of Inquiry on the Poor Law Bill, agricultural labourers are unable to procure for themselves and families an average allowance of more than 122 ounces of solid food weekly, and this chiefly of bread. In the six dietary tables from which the guardians of the poor in England are required to select, the lowest amount of solid food weekly is, for men, 145 ounces, and for women, 129 ounces, and the highest allowance, 202½ ounces for men, and 186½ ounces for women. The average, however, of the whole six dietaries is 179 ounces of solid food weekly for men, and 152 for women. It is thus apparent that the diet of the poor-houses is superior to that which the agricultural labourer can procure. In the navy, again, the weekly allowance of solid food, when it consists of fresh meat diet, is 302½ ounces, or, when of salt meat diet, 290 ounces of solid food, and in addition each man has weekly 7 gallons of beer, half a pint of vinegar, and 1¾ ounce tea. It is quite apparent, then, that the navy supplies are ample. The soldier again receives 196 ounces of solid food weekly, but he is allowed to supply himself with other provisions. The prison diet, again, for England, has been carefully formed with the view of being no more than sufficient to maintain health and strength, and at the same time be at the least possible cost to the public. In proportion to the length of confinement and the work required of the prisoners, more solid food and a greater proportion of animal food is given, and a sufficient variety to prevent disease. Prisoners confined under fourteen days and not at hard labour receive weekly—the men 168 ounces of solid food and 14 pints of gruel, and the women 126 ounces of solid food and 14 pints of gruel. Those put to hard labour for from fourteen days to six weeks, receive—the men, 238 ounces of solid food and 14 pints of gruel, and 2 of soup weekly,—the women, 196 ounces of solid food and 14 pints of gruel, and 2 of soup weekly. When on hard labour for periods exceeding three months, the weekly allowance of the men is 254 ounces of solid food, 11 pints gruel, 3 pints soup, and 3 of cocoa; and for the women, 194 ounces of solid food, 11 pints of gruel, 3 pints soup, and 3 of cocoa.

The author's remarks on the diet for the sick are valuable. It is difficult to give an average of the dietaries for the sick in the various London hospitals. The full diet is above the average of what the poor are able to provide for themselves, but is not excessive, and, generally speaking, the low and fever diets seem to be well adapted for their intended uses.

The author's work is concluded by some general remarks on the dietetical regimen, suited for disordered states of the digestive organs. Most of the topics here discussed are treated of more fully in other parts of the work. In short, this chapter is a condensed summary of those facts previously stated, which bear on disordered states of the digestive organs.

ART. II.—1. *Cases of Peritoneal Section, for the Extirpation of Diseased Ovaria, by the large Incision from Sternum to Pubes, successfully treated.* By CHARLES CLAY, Member of the Royal College of Physicians, London, &c. 4to. London, 1842. Pp. 18.

2. *Removal of a Dropsical Ovarium.* By GEORGE SOUTHAM, Surgeon to the Salford and Pendleton Royal Dispensary, Manchester. 8vo. London, 1843. Pp. 11.

3. *Four Cases of Dropsical Ovaria removed by the large Abdominal Section.* By D. HENRY WALNE, Esq. of London. (London Medical Gazette from December 1842 to February 1844.)

SINCE we had occasion, in 1825, to notice Mr Lizars's "Observations on Extraction of Diseased Ovaria," numerous patients, both in this country and in America, have been subjected to the abdominal section for the removal of ovaries diseased or reputed diseased. The publication of Mr Lizars's work, however, seems to have satisfied most surgeons in this country that the abdominal section for the removal of such tumours was one which was scarcely justifiable, and to have consequently deterred them from imitating that operation. Our readers will recollect that, in the first of Mr Lizars's cases, after the abdomen was laid open, the ovaries were found both sound; the patient, however, recovered. In the second case the two ovaries were diseased, but only one could be removed. This case also recovered. In the third case a large tumour was removed, but the patient died fifty-six hours after the operation. And in the fourth case the tumour had contracted such firm adhesions to the surrounding parts, that it was found impossible to remove it. This patient also recovered.

AN important conclusion, however, seemed deducible from these cases of Mr Lizars, which was, that large incisions could be made with comparative safety into the abdominal cavity, without being followed by those fatal symptoms usually supposed to ensue on peritoneal wounds. They also seemed to prove that the bowels could be handled pretty freely, and yet give rise to no uncontrollable inflammatory action. In this country, however, surgeons

seem to have looked to the difficulty of discovering whether a tumour were really present, and if present, whether it had not contracted such numerous adhesions as would prevent its being removed after the abdomen were laid open. And when we consider that of the four cases operated on by Mr Lizars, in only one was the tumour or tumours in a state capable of being removed, and that that patient died, it may be safely inferred that the public voice in this country would be raised against repeating such formidable operations, and that few or none would be attempted. This accordingly seems to have been the case; for, as far as our recollection serves us, we are not aware that even Mr Lizars felt himself justified in repeating his attempts to remove diseased ovaria by means of this operation.

Of late years, however, a few English surgeons, chiefly perhaps from viewing the question in the first light above alluded to, and seeing nothing to prevent them ascertaining, with tolerable accuracy, the nature of the abdominal tumour, have operated with success in several instances—with such success, indeed, as to be induced to operate as often as a favourable case occurs. As the natural consequence, however, of surgeons viewing peritoneal wounds in different lights, two distinct modes of operating have been adopted. The *first*, recommended and practised by Jeaffreson, King, West and Phillips, consists in the making an incision through the parietes of the abdomen, of an inch and half or so in extent only, puncturing the tumour, evacuating its contents, and extracting through this small opening the collapsed cyst. It is evident that this plan can only be put in practice when the enlargement of the ovary consists chiefly of fluid of some kind; and as this fact is far from being always ascertainable before hand, this plan does not seem to be capable of general application. The *second* plan of operating, that recommended and practised by Smith, Macdowall, Lizars, Clay, Atlee, Southam, and Walne, consists in making a free incision from nine to fifteen inches in length through the abdominal parietes; in fact, in laying open the whole abdominal cavity, and thus having free room for the removal of the ovarian tumour.

The cases recorded by Dr Clay are five in number, of which the first three were successful and the last two fatal. Mr Southam's case was successful; and of the five cases operated on by Mr Walne, three were completely successful; in one the tumour was found to have contracted such firm adhesions, that nothing was done beyond making a tentative or exploratory incision, from which she soon recovered, and one proved fatal.

Dr Clay's cases were originally published in the 7th volume of the Medical Times, and in his introductory remarks he states that he resolved on adopting the large incision in preference to that re-

commended by Jeaffreson, because "we can make an opening of any extent, and explore the viscera without any more danger of inflammation than *might follow* the most trifling puncture of the peritoneum;" because adhesions may exist which require to be overcome; because great portion of the tumour may be solid, and could not be dragged through a minute aperture; and lastly, because of eight recorded cases operated on by the small incision five proved fatal, while of the ten recorded cases in which the free incision was practised, only one died. Dr Clay's first case was as follows:

1. Mrs Wheeler, 46 years of age, had suffered from abdominal enlargement upwards of three years. She had always enjoyed tolerably good health, had eight living children, and had had one miscarriage. She never felt any pain in the enlargement, and the catamenia were regular. The sensation experienced from the tumour was weight and encumbrance more than any thing else. She was much emaciated, tall in person, of a sallow countenance, and appeared as large as a female in the ninth month of gestation. On examination the coats of the vaginal canal were found protruding outwards to a considerable extent; the pelvic cavity was filled with a large tumour, whose extent could not be ascertained, and which could not be moved by the finger in the least degree. The uterus was lifted upwards, and the *os uteri* rested on the upper and inner surface of the *symphysis pubis.* The external surface of the tumour, felt through the distended abdominal parietes, exhibited protuberances in various parts. The tumour was distinctly moveable under the parietes, and a small quantity of dropsical fluid in the abdominal cavity gave the idea of the tumour floating free, held only by its pedicle. The left iliac region was more filled by the tumour than the right, but the patient thought she felt earlier more inconvenience on the right than the left. She was examined by one or two other surgeons, when all agreed it was an ovarian tumour. As iodine and appropriate treatment failed to reduce its size, Dr Clay resolved to remove it by operation, as the woman was of a strong mind, and was urgent for an operation.

The 12th September 1842 was fixed as the day of operation. On the 11th she was in excellent spirits, pulse 70, calm and soft. She was ordered ten grains of inspissated ox-gall to clear the bowels effectually previous to the operation. In all these operations it has been found requisite to have the temperature of the room high; but as the thermometer stood at 68° Fahrenheit, and the room was small, no artificial means were resorted to for this purpose.

The patient was placed on a long narrow table, with the head a little raised, and at one incision the integuments of the abdomen

were severed from a little below the ensiform cartilage to the *symphysis pubis.* They were extremely thin over the most prominent part of the tumour. The peritoneum was then carefully cut into at the sternal extremity of the incision, so as to allow two fingers of the left hand to be introduced. An adhesion was met with, but gave way, being recent. A probe-pointed bistoury, guided by the fingers, opened the peritoneum to the same extent as the external incision. The incision could not be less than twenty-four inches in length over the tumour. The parietes rapidly retired, and the enormous tumour projected forwards. The uterus was seen lying on the anterior and lower portion of the tumour, its right broad ligament being expanded over and forming the pedicle of the tumour, the left ligament and ovary, together with the uterus itself, being quite healthy. The pedicle was then secured by a strong ligature and cut through, but being of considerable thickness the ligature did not prevent the bleeding, so that it was necessary to take up each vessel separately. The hand was then passed round the tumour, and a few recent adhesions gave way without the aid of a scalpel. An extensive omental adhesion required to be dissected off; but only one vessel required to be tied, the ligature of which was cut short off. The tumour was now raised up, and, with the assistance of one of his friends, it was pulled out of the pelvic cavity. This required considerable exertion, as the tumour filled the whole cavity, and the attempt to remove it was similar to that of drawing a cupping glass from off a fleshy part of the body. The patient had a teaspoonful or two of brandy and water given her, and the parietes of the abdomen were brought temporarily together and held there, till all the watery fluid slightly coloured with blood had oozed away from the lower portion of the incision. The integuments were then brought together by nine stitches, with straps of adhesive plaster between each, with long straps over the ends of the cross straps. Two long pads of linen were laid on each side of the incision, and over all a stout bandage of some breadth. The tumour itself was removed and the vessels secured in twelve minutes and a half, and the patient was lifted into bed about forty-five minutes from the commencement of the operation. About fourteen ounces of blood were lost.

Dr Clay gives, in a tabular form, the history of the case for five days after the operation; during all which time the temperature of the room was kept about 70°. Eight hours after the operation, as the pulse rose to 90, and was strong, sixteen ounces of blood were drawn from a free orifice, causing sickness. Nineteen and a half hours after the operation, the pulse having again got strong, eight ounces of blood were drawn from the arm, also causing sickness. In both cases the blood exhibited the buffy crust.

During these periods the tongue and skin were dry, and thirst was complained of. For the first six hours some pain was complained of in the loins and right iliac region, but this was attributed to the stretching of the pedicle of the tumour during the operation, and to the ligatures left on the vessels. This abated on the first bleeding, and did not return after the second. The urine was drawn off by the catheter, several enemas with castor oil given, and gruel, panada, toast, and tea given as food. It is unnecessary to go over the particulars of the case. No shivering or hæmorrhage occurred. The wound was dressed for the first time on the fifth day. The wound was found healed, with the exception of about half an inch near the umbilicus, and about the same space near the pubes where the ligatures came out. Flatulent distension, which was troublesome the third day, was effectually relieved by the introduction of an elastic tube into the rectum. On the ninth day four of the stitches were removed, and the remainder two days thereafter. On the eleventh day after the operation she was allowed butcher-meat. On the twelfth day she was allowed to sit up occasionally. On the eighteenth day she joined the family circle, and was soon able to resume her ordinary duties.

The tumour weighed 17 pounds 5 ounces; its largest circumference was 3 feet 8 inches; its shortest, 2 feet. The substance was composed partly of cysts filled with a glutinous-looking matter, not unlike the albumen of an egg half-boiled, and partly of more solid minute cells formed of fibrous and cartilaginous structures.

2. Elizabeth Beswick, aged 57, applied, on account of dropsy of the belly. She was tapped, when about twenty-five pounds and a-half of fluid were removed, and in the left iliac region an ovarian tumour, of about four pounds weight, was discovered. Both the tumour and the dropsy had come on during the last ten months. She had borne nine living children. The tumour was minutely examined, when the parietes were flaccid from the withdrawal of the water. It appeared circular, somewhat flattened, with a long pedicle, and apparently firmly attached to the parietes below the umbilicus, over a space of two square inches. It also felt hard and heavy for its size, and was concluded to consist of a solid mass.

The 7th October being fixed for the day of operation, ten grains of inspissated ox-gall were administered on the evening of the 6th, which brought away a copious motion, without uneasiness, before bed-time. Five grains more given next morning produced another full motion before noon. The incision in this case was made only about ten inches in length, on account of the smaller size of the tumour; but greater difficulty was experienced in dividing the parietes than in the last case, on account of the greater flaccidity of the abdomen. When the tumour was exposed it was found to

have contracted firm adhesions in every direction, which could only be removed by the scalpel. Those to the parietes were short and broad; those to the viscera were narrow and long, and had allowed the free motion observed in the tumours. A strong double ligature was passed through the pedicle, and tied in both sides; it was then cut across, in doing which a cyst was opened, and about four pints of fluid were discharged. The uterus and viscera generally were healthy. No ligatures, besides the double one on the pedicle, were required. The parietes were secured by seven interrupted sutures, straps of adhesive plaster, &c., as in the first case. The whole time consumed in the operation was about ten minutes, and in twenty-five minutes from the commencement she was placed in bed. Not above two ounces of blood were lost. The pulse had scarcely varied a single stroke during the operation. She got a draught, with three-fourths of a grain of muriate of morphia, with an ounce of camphor water, and was left composed, if not really cheerful.

Not a bad symptom appears to have occurred in this case. She passed her urine naturally; a few hours after the operation enjoyed a smoke of her pipe; had no shivering, cough, or tendency to inflammatory action. She complained of severe pain in the iliac region, for which the morphia was given immediately after the operation; she had several refreshing sleeps, and the pain soon left. On the fourth day the wound was dressed, and every alternate suture removed. The wound was found united at all points, excepting that at which the ligatures projected. She was allowed mutton broth on the fifth day. All the sutures were removed on the seventh day. She was allowed to sit up on the eighth day; and by the fourteenth day she was allowed to use all liberty, being considered as cured.

The tumour, when emptied of its contents, weighed nearly five pounds. The form of the tumour was an oblong spheroid, and it was composed of a white tough membranous bag, capable of holding about four pints of fluid, and of a flattened round solid mass, the cells of which contained various matters from the consistence of purulent matter to that of cerate, the interstices being of a hard cartilaginous structure.

3. Hannah Edge, aged 39, tall and emaciated, mother of three children, about seven years ago, after the delivery of her second child, discovered an enlargement in the right side of the lower part of the belly. Four years ago was delivered of her fourth child, but the abdomen remained nearly as large as that of a person just about to be confined. She had been tapped three times, the first time two punctures being made. She was now so enormously large that the umbilicus almost touched the knees. Tapping was first performed, when about thirty pounds of a dark-glairy

fluid were removed. When the fluid ceased to run, as a large globular tumour still remained, the trocar was again introduced through the canula, and pressed against it, when about thirty pounds more of a bright limpid fluid were evacuated. The flaccid integuments then hung down between the legs. In the right iliac region one tumour, of two or three pounds weight, could be felt, and in the centre above the pubes another of about two pounds weight; and higher up on the left side another small tumour was felt. Dr Clay's friends considered the adhesions very extensive, but he did not participate in this opinion; as he had remarked that where there were extensive deposits of water, "the adhesions were likely to be of a less serious nature, and more easily separated than if the tumours were of a more solid nature."

By some strange mistake the description of the operation, and of the tumour, together with the treatment till the third day after the operation, are omitted; suffice it to say, however, she recovered more rapidly than even the first two operated on. She sat up in the eighth day, was walking about the house on the eleventh day, and was considered as cured from the twelfth day.

4. Mrs Dillon, 47 years of age, had been married eight years, but had no children. She had for several years laboured under abdominal enlargement. The abdominal tumour was hard to the touch, without fluctuation, excepting on the left side, and so extremely large as to fill completely the whole abdominal cavity. From there being only the smallest possible quantity of ascitic fluid, the tumour had not much mobility. She was forty-five inches in circumference at the umbilical region, and the tumour was estimated to weigh thirty-five pounds. She was subject to occasional severe pains in the back, and in the iliac region. The tumour, when first noticed, occupied the left iliac region. She had been tapped about two years previous; but only about two pints of thick bloody fluid were extracted, affording no relief. She was urgent for an operation, and unfortunately the catamenia appeared the day fixed for the operation.

When the tumour was laid bare it was found quite impracticable to remove it, as the whole anterior surface of the tumour was adherent to the peritoneum. The tumour, too, appeared highly vascular, quite different from the generality of ovarian tumours. In order to endeavour to lessen its size, it was pierced in several places with a fine stiletto, but a jet of pure blood issued from each puncture. The wound was, therefore, closed, dressed in the usual manner, and as her mind was much depressed from the fact of the tumour not being removed, she was given a grain of muriate of morphia.

On the termination of the fourth day, the wound was dressed; it was found united nearly in its whole length, excepting about

two or three inches above the pubes, where adhesion had not taken place. On the fifth day she was still progressing favourably; but on the termination of that day, pain of the left leg, with swelling from the toes to the middle of the thigh came on; the pulse was quick, feeble, and thready, the surface warm and moist, and no thirst; she, however, became rapidly worse, and sunk in less than twelve hours after this attack. Dr Clay attributed the sudden change to the husband having probably administered to her some gin and water.

5. Mrs Hardy, aged 45, never had any children, and appeared about the size of a female in the eighth month of pregnancy. The abdominal tumour had a lobulated, hard, and unyielding feel, and no fluid could be detected in it. It appeared not to have the slightest peritoneal attachments, and could be easily moved under the integuments. It occupied more of the right than the left side.

An incision thirteen inches in extent was made through the abdominal parietes, and, as had been anticipated, no peritoneal adhesions were found. The tumour was of a bright pink colour, was as hard as a piece of boiled liver, and was composed of numerous small lobes with acute edges. It appeared to weigh about 12 pounds. The pedicle of the tumour was composed of both Fallopian tubes, and the greater portion of the uterus itself. Dr Clay, however, resolved on proceeding, and passing ligatures around the Fallopian connections as well as the central uterine attachment, the parts were then divided and the tumour removed. The ligatures proved insufficient to arrest the hæmorrhage, and the blood lost before the vessels could be secured, produced repeated attacks of syncope, to which she had been subject for some time previously. She accordingly sank about an hour and a-half after the removal of the tumour. On a *post mortem* examination, it was found that the part severed was so charged with vessels that the section presented open mouths almost as numerous as the cavities in a piece of sponge. A small portion of the cervix and the *os uteri* were the only parts of that organ not involved in the disease.

Mr Southam's case was as follows:

Mrs H., aged 37, the mother of five children, two years and a-half ago, when five months advanced in pregnancy, lifted a heavy washing tub, when she felt something give way in her left iliac region. This caused her to faint, and afterwards vomit about a table-spoonful of blood. Two months after her confinement, which was tedious, she perceived a small tumour above and to the left side of the pubes; and at the same time the belly began to swell, and was attended with occasional severe pain. Remedial treatment had frequently reduced the swelling considerably. When examined by Mr Southam, she had the appearance of a woman in the

sixth month of pregnancy; complained of pains in the abdomen, especially on the right side, which prevented her from lying on the left side. The catamenia were regular, and general health apparently good. A circumscribed tumour was felt above the pubes, inclining to the left side. It was very moveable under the integuments, but caused pain in the left side when drawn upwards. There was distinct abdominal fluctuation. The walls of the vagina were beginning to protrude externally, the *os uteri* was natural, and the uterus itself seemed not to be included in the disease.

The 20th October 1843 was fixed as the day of operation, and Dr Clay, with other friends, assisted. Ox-gall disagreeing with this patient, her bowels were cleared out the day previous with castor oil, and an enema was administered some time before the operation. The temperature of the room was raised to 70°, and the patient being properly laid, an incision was made from the right of the umbilicus, along the mesial line, to within three inches of the *symphysis pubis.* The peritoneum being exposed, it was punctured midway between the umbilicus and pubes, when about four quarts of dropsical fluid escaped. The opening was then enlarged so as to admit the finger, and finding no obstacles to the operation, the incision was prolonged upwards and downwards with a probe-pointed bistoury to the extent of nine inches. The omentum was firmly adhering to the tumour on the upper part, and required to be dissected off. The tumour was then found to be connected with the left broad ligament. It was raised, but as the patient became very sick, and the intestines distended with flatus protruded around the pedicle, instead of passing the ligature needle through the pedicle, a small aperture was made with the scalpel, and two ligatures passed through and tied in opposite directions; one unfortunately broke. The pedicle was then divided about an inch from the ligature, and the tumour removed. Very little blood escaped into the abdominal cavity. The parietes were then brought together, and held there by seven "uninterrupted" (?) sutures and adhesive straps. The ligatures were tied in a knot and placed at the lower extremity of the wound. Two long pads were placed on each side of the incision, and the whole secured by a broad bandage. Not more than three ounces of blood were lost. A grain of muriate of morphia in an ounce of camphor mixture was administered after she had been put to bed. After being put to bed she was sick several times, and complained of pain in the loins and left side.

About nine hours after the operation, in consequence of troublesome cough, flatus, feeble and small pulse, and vomiting, it was found requisite to repeat the morphia, and as she rejected it by vomiting, a grain of the acetate of morphia was given in pill about two hours afterwards. After this she slept for about two hours.

Vomiting then returned, with pain in the epigastrium and left side, flatulent distension of the bowels, and tenderness from pressure. The pulse was 110 and fuller than before; some thirst and heat of skin were present. About eighteen hours, therefore, after the operation she was bled to twelve ounces, which produced faintness. She passed her water naturally.

It is unnecessary to follow the particulars of this case every day. Suffice it to say that, for several days, the danger was eminent. She suffered much from sickness and occasional vomiting, but especially from tympanitic distension of the abdomen, with much passage of flatus. The wound was examined the end of the second day, and found almost healed; but the ligatures had slipped into the abdominal cavity, and were not again recovered. They did not, however, appear to give rise to any special irritation beyond what poultices, fomentations, and enemata removed. Four of the sutures were removed by the end of the third day, and the remainder two days after. She was not able to sit up till the fifteenth day after the operation, at which time the wound was not quite healed below the umbilicus, but required to be touched with nitrate of silver.

The tumour weighed four pounds twelve ounces, and the dropsical fluid which accompanied it, fourteen pounds. It was composed of solid matter and several cysts of different sizes, which gave it a lobulated appearance externally. The solid portion chiefly occupied the portion next the pedicle.

Mr Walne's cases were as follow:—

1. Mrs F., aged 58, had an abdominal enlargement equalling that of pregnancy at the full period. The catamenia had ceased for four years. She had five living children, and several miscarriages. She had noticed her gradual increase of size for two years; but it was attended by no pain, but only proved an encumbrance. The tumour appeared to be circumscribed and moveable; there did not appear to be any symptoms of general dropsy, and the health was good. It was evidently an ovarian tumour. From *scrobiculus cordis* to the pubis was seventeen and a half inches; her circumference was thirty-seven and a half inches.

An operation having been resolved on, the 6th of November 1842 was fixed as the day on which it should be performed, and the room was heated rather above 70°. The laxative given the day before not having opened the bowels, an enema, given half an hour before the hour named for operation, gave the desired relief. The patient was laid on a couch with her feet on the ground at its end, and her back supported by pillows. Mr Walne seated himself on her right, and his numerous assistants, of whom Dr Blundell was one, around her. For the satisfaction of all parties an exploratory incision of an inch and half was first made through the

skin, tendinous expansion, and peritoneum; a finger was then pressed in on each side when the fluctuating cyst was clearly felt. No fluid escaped. The wound was enlarged with the scalpel upwards and downwards, including the preliminary incision, to an extent of about thirteen inches, and a probe-pointed bistoury, guided by the fingers, divided the peritoneum to the same extent. The tumour then advanced forwards through the aperture. No adhesions were met with. A double ligature was therefore passed through the middle of the pedicle, and each end tied separately. The first ligature broke, but a new one being introduced and tied, the pedicle was divided, and the tumour, of sixty-six pounds weight, was removed entire. A considerable artery was then tied on the surface of the pedicle. At this period the patient became very sick, and made repeated efforts to vomit, but nothing was brought up. As a general oozing of blood continued from the cut surface of the pedicle, it was tied in its entire circumference, and the wound brought together by about a dozen sutures through the integuments, the places having been previously marked in order to produce exact opposition of the parts. Long pads of lint were then laid down a little distance from the wound, and strips of adhesive plaster carried over the whole from one end of the body to the other. A broad bandage, entire in the middle, but split into eight roller heads, and laid ready below her back, was made comfortably tight, and the ends, after once encircling her, tied on alternate sides of the abdomen.

At the conclusion of the operation the pulse was 76, the same number as it had been the morning before. She was, however, pale and cold. She was put in bed with a hot bottle at her feet, and had administered a draught of a quarter grain of acetate of morphia, with one and a half ounces of *mistura camphoræ*, which was repeated in an hour. She then became warm, perspired freely, and slept for two hours. Some pain was complained of in the loins, but soon ceased, and was succeeded by throbbing, which ceased in the course of the night. Her urine was drawn off about midnight. She slept a considerable portion of the night, and of the next day; was free from abdominal tenderness, except in the line of the wound; and had no distension, flatulence, or sickness. The urine was occasionally drawn off. The second day after the operation she was more uneasy, and was occasionally annoyed by vomiting and eructation of wind. She passed her urine naturally the third day after the operation. Five days after the operation the wound was dressed, when all the stitches below the umbilicus were removed, but not those above it. The ligatures had apparently slipped within the abdomen, and it was considered imprudent to make any attempt to search for them. Vomiting, retching, and nausea, hiccup, drowsiness, pain at navel, &c. came

on this day, but anodynes and enemata, the last of which brought away a hard lump of feculent matter, greatly relieved her by the next day. On the seventh day after the operation she had still slight hiccup, but all the other symptoms were relieved. The wound was again dressed; the remaining stitches removed; but, from applying one of the straps of sticking plaster too tightly over a part of the wound which was not yet closed, symptoms came on resembling that of strangulated hernia. On raising this plaster, it was found that a fold of intestine, slightly protected by adhesive matter, had been pressed on; but by relieving this all the symptoms were relieved. Twelve days after the operation she still felt uncomfortable, and had slight difficulty in passing her urine. Fifteen days after the operation she sat up in bed several hours. On the seventeenth day the ligatures appeared at the lower end of the wound, which was not yet healed. On the nineteenth, the one which secured the artery came away. And on the twenty-first, the wound was all healed, with the exception of some redundant granulations about the umbilicus, and a seton-like aperture where the ligatures still protruded. It was not, however, till about "ten weeks after the operation" that the ligature came away, and in a few days the canal closed and the patient's cure was complete.

The tumour consisted of one or more cysts filled with fluid. One portion, however, about the size of two fists, consisted of a more solid structure, having in some points a scirrhous hardness.

2. Mrs M. R., a widow, 57 years of age, never had children, having been married late in life, but suffered much at each menstrual period. For the last sixteen years she thought herself larger on the left side of the abdomen than on the right, but felt no inconvenience till about eight years ago. At that time she consulted a surgeon on account of tenderness on the lower part of left side of the abdomen, and was told she was labouring under disease of the ovary. Within the last year the abdomen had enlarged greatly, and she was now the size of a woman in the eighth month of pregnancy. There was distinct fluctuation and dull sound over the greater part of the abdomen, with a circumscribed character of tumefaction. A sense of dragging about the cartilages of the ribs, chiefly on the right side, was her principal uneasiness. The uterus appeared healthy, and of moderate size, and she had no symptoms of general dropsy. Her general health was good, with the exception of some symptoms of feeble digestion. In order to give her a fair chance of cure by means of medicine, she was put on the *Liquor Potassæ* and hydriodate of potash in bitter infusion with tincture of colombo, and kept on this for more than two months. Her size, however, continued to increase, and an operation was decided on.

Previous to operating, a few preliminary measures were adopted; as absolute rest in the house for a few days previous, with attention to the bowels; marking the abdominal skin with nitrate of silver in lines crossing the *linea alba*, so as to secure correct adjustment of the wound; supporting her well with nutritious food, which would leave little residue in the bowels; and clearing the bowels thoroughly, immediately before the operation, by an aperient over night, and an enema that day. About a pint and a half of good beef-tea was also administered about two hours before the operation, to prevent that coldness and sinking observed in the first patient operated on. The temperature of the room was maintained a little above 70° of Fahrenheit.

Tuesday the 30th May, about five o'clock, the patient was laid on a couch, her feet resting on the floor over its end, her back well propped up by pillows, and an eight-headed roller laid below her back. A small incision was then made through the skin about an inch and a half long, when a little fluid escaped, probably from the sheath of the right rectus muscle; the peritoneum was then cut into, when a finger was found to pass easily between the tumour and the peritoneum, and no adhesions were discovered. Every thing being thus favourable, the skin was divided from above downwards to the first wound, and thence to the pubes, in all to the extent of about twelve inches. The peritoneum was then opened a similar extent by means of a probe-pointed bistoury, guided by the fingers. The tumour, which had no adhesions, then advanced forwards, and, being supported, a double ligature was carried through the middle of the pedicle, which was formed of the left broad ligament. The first half of the ligature held, but the second broke and required to be replaced. The pedicle was very short, and the uterus lay back in the pelvis, with a portion of the ovarian sac in front of it. Hæmorrhage followed the division of the pedicle, but was arrested by surrounding the whole pedicle with another ligature. The advantage of the large incision was at this stage particularly experienced. The coagula being cleared away, the wound was brought together by nine interrupted sutures, and was otherwise dressed as the former case. She was then put to bed, an opiate administered, and again repeated in an hour. No faintness occurred in this case; and her pulse was firm, though frequent.

She slept some after the operation; was thirsty and drank much water, and had her water drawn off by the catheter. The next day the pulse was about 120. She had perspired freely, but had no sickness, shivering, or chilliness. There was no distension or tenderness of the abdomen, but pain in the line of the wound and in the left iliac region. For forty-eight hours after the operation she had nothing but water, and was in all respects going on well. On the third day after the operation the wound was dressed, when

it was found to have united throughout, except for about three-quarters of an inch at the lower end, where the ligatures of the pedicle were attached. On the sixth day she tried to sit up, but felt giddy. A miliary eruption appeared on the skin. On the seventh day the wound was again dressed, when, on two or three spots where the skin was not very closely adjusted, small quantities of purulent matter were seen. Inspissated ox-gall had been given from the fourth day to regulate the bowels. Up to the end of the seventh day every thing had proceeded favourably; but on the eighth day it was found she had passed a restless night; and complained of uneasiness in the left iliac region, with one tender spot "like an intestine in a state of contraction." A purgative was administered, an enema in the evening, and an anodyne draught. On the ninth day rheumatic pains of the arm and shoulder, with stiff neck, came on. There was still uneasiness in the left iliac region, and the left leg was swollen. She had no shivering or sickness, but the pulse was 110. The pains in the limbs increased in the evening, and the right leg, too, was painful on being moved. The next day, the tenth after the operation, it was evident she was labouring under "mild *phlegmasia dolens*, or inflammation of the veins" of the left leg. It pitted on pressure, and was much swollen. The groin was therefore twice leeched, and quinine and mercury given. From this period she slowly recovered. The miliary eruption, however, from the breaking of the little vesicle close to the wound, caused its whole line to be raw for a couple of days. She had perspired freely, in some instances profusely, for some days previous. The ligature which was first tied came away in about five weeks. The others were remaining when the case was published.

The tumour weighed sixteen pounds and three-quarters, and measured 2 feet 11½ inches in one direction, and 2 feet 6 inches in another. It seemed to be less solid than the one removed in the first case.

3. Miss A. K., 20 years of age, had observed the abdomen to enlarge for several years past. In 1839 her size attracted notice, and she was obliged to leave her place as governess in a family. She was subjected to various kinds of treatment, which had, however, no effect in reducing her size, which was recognized to depend on a diseased ovary. The abdomen was as prominent as at the full period of pregnancy, with greater fulness towards the loins. The tumefaction was circumscribed, very regular, and distinctly fluctuating. The health appeared good, the uterus was natural, and no symptom of general dropsy was present. Though of a tall slim figure, she measured forty inches in circumference.

The 12th of September was, after some delay, fixed on as the day of operation, and the patient was prepared by attention to her diet and bowels for some days previous. At two o'clock of

that day she took a good basin of beef-tea, at three an enema, and the operation was begun at a quarter before five, the patient being placed, like the previous one, on a couch. A small preliminary incision of one and a half inch in length was made in the *linea alba* below the umbilicus, to ascertain whether any adhesion existed, and then the incision was enlarged to the extent of fourteen inches. The peritoneum was carefully opened to a like extent by means of a probe-pointed bistoury, guided by the fingers, when the tumour advanced forwards, being free of adhesion. The broad uterine ligament of the left side formed its pedicle, and through this a double ligature was passed, tied, and the pedicle divided between the tumour and the ligature. No bleeding followed the division of the pedicle. The abdomen was then cleared of blood, and the wound closed by thirteen interrupted sutures, and the whole dressed as in the former cases. She was faint after the operation, and got some brandy and water, and vomited after being put to bed. An anodyne of a quarter of a grain of acetate of morphia in one and a half ounce of camphor mixture was given, with directions to repeat it in half an hour.

This case appears to have recovered without any bad symptoms occurring to delay the cure. On the evening of the second day after the operation, she was able to pass her water naturally. On the third day after the operation, the wound was dressed and found adhering throughout; the stitches were therefore removed. No purulent matter was seen on any part of the wound. Two days afterwards it was again dressed, and seemed to be perfectly united, no purulent matter whatever appearing. On this day, the fifth after the operation, the bowels were cleared out by enemata for the first time; no distension or abdominal uneasiness had been experienced from the continued constipation. On the seventh day, some thick purulent matter was remarked at a few spots along the line of incision, and at the point where the ligatures came out. Some days afterwards redundant granulations required to be touched with the nitrate of silver. She walked across the room on the 29th of the month, and gained strength from that date.

The tumour weighed 28 pounds; and measured 3 feet 8½ inches in one direction, and 3 feet 2 inches in another. It chiefly consisted of one large vascular cyst.

4. Mrs H. aged 54, the mother of five children, applied to be relieved of ovarian dropsy. Her disease had existed for four years. She had been tapped in December 1842, and again on 3d August 1843. The liquid removed was said to be yellowish, and like the white of egg in consistence. By September 5, her dimensions had again increased to 41¾ inches in circumference, and 19 inches from *scrobiculus cordis* to the pubes. She was again tapped on the 21st of September, as the distension had

caused an œdematous state of the skin of the lower portion of the abdomen. Having resolved to operate, the 11th of October was chosen as the day of operation. The integuments in the direction of the *linea alba*, a little below the points at which she had been tapped, were divided to the extent of an inch and a-half; then the tendinous parts and the peritoneum. Some adhesions were then discovered between the peritoneum and sac on each side of the wound, but of small extent, and chiefly filamentous. None were discovered in the pubic direction, and these were therefore attributed to the tappings. The incision was therefore extended upwards so as to open the structure to the extent of about five inches in all. Adhesions were also divided on each side of the wound, but it was found that the adhesions became wider in extent, stronger and more intimate. It was therefore considered best to stay proceedings. The wound was therefore closed with six stitches, a strip of lint laid over it, over this supporting plaster, and a broad flannel roller. The cure proceeded favourably. On the fourth day after the operation, the stitches were removed. On the sixth day the increased distension of the abdomen had re-opened the wound for nearly two-thirds of its length. The peritoneum, however, was united as well as the deeper seated textures. Lint was laid along the wound, and long supporting stripes of plaster carried over it from side to side of the abdomen, and a bandage over all firmly applied to the lower portion of the abdomen. After this the wound steadily cicatrized. She again required to be tapped on the 27th of October, 27th of November, and 26th of December.

5. Miss N., aged 45, had been frequently tapped on account of ovarian dropsy, and but a few days before being seen by Mr Walne. The night before being seen the puncture had re-opened, and allowed several pints of fluid to escape. Notwithstanding this the abdomen remained distended, with a sensation of distinct fluctuation at its upper part. There was considerable hardness on the left side; the pelvis was found to be filled with a hard tumour, and the *os uteri* was pressed forwards towards the *symphysis pubis*. As much fluid was contained in the abdomen she was tapped above and to the left of the umbilicus, where the abdomen was very prominent. Her size still continued great, and it was thought that it was a case of ascites combined with encysted dropsy, or that two enormous cysts of the same ovarium existed simultaneously. She afterwards came to London; but on consultation it was agreed that it was not a case for operation, and she was sent back again to the country.

Shortly after this she was again tapped, when fifty pints of fluid were drawn off, and having heard of Mr Walne's third successful case of operation, she insisted on being operated on, convinced as she was, as well as her medical advisers, that a few weeks, or months

at most, would terminate her existence were the disease allowed to run its course. An operation was therefore resolved on, and the 19th of October was the day fixed for that purpose. Though only about a fortnight from the last tapping she measured 49¾ inches in circumference, and 28 inches from the *scrobiculus cordis* to the pubes. Her general health was rather good, though feebleness and emaciation were rapidly increasing. Her appetite was good; her pulse calm and of moderate frequency.

The patient being seated in a half-reclining posture, with her feet resting on the ground, an incision of two inches in length was made in the *linea alba* below the umbilicus, and the peritoneum opened to a like extent. Ascitic fluid flowed abundantly. A finger being introduced by this aperture, discovered an ovarian tumour floating free in ascitic fluid, and as the fluid escaped its fundus could be detected. The incision was therefore prolonged to an extent of about fifteen inches, and the peritoneum opened as on former occasions. The tumour came readily forward; the pedicle, formed of the left broad ligament, was pierced by a needle with a double ligature, and when these were secured it was divided between the ligatures and the tumour. The hard tumour which filled the pelvis was next examined, and found to consist of an indolent fibrous tumour of the uterus. It was therefore not interfered with. The wound was therefore closed by eighteen points of interrupted suture and dressings as in the former cases.

The patient bore the operation well, had a little brandy and water given, and when placed in bed an opiate, which was repeated in the course of one hour. Vomiting commenced about an hour after the operation, and returned twice or thrice during the evening. Aching pain at the lower part of the abdomen and in the back were complained of. She passed a tolerable night, dosing at intervals, chiefly, perhaps, from the opiates, of which four doses were administered. She went on tolerably well till the 23d, when the wound was dressed, and all the stitches removed, as it appeared to be substantially united. Next day she began to be troubled with flatulent distension of the bowels, and the lower extremity of the wound was found to be discharging a little thick healthy purulent matter. On the 25th there was a slight blush along the edge of the wound, the healing power seeming deficient, — cinchona was therefore administered. On the 27th the upper part of the wound, where it was apparently soundly healed, began to furnish matter, and the thread-holes opened afresh in several places, with an unhealthy pustule in each. The skin of the abdomen, under the plasters, had also festered in several places. She was much worse during that night, and on the morning of the 29th the pulse was above 140, and could scarcely be felt. She vomited constantly. Her feet and hands were cold and livid; clammy perspiration covered the skin; she

was moaning with distress, and complained of uneasiness in the right side and across the abdomen, and of great distension. She died at eight in the evening.

The tumour which was removed by the operation was fourteen pounds in weight, nearly five of which were solid matter, and the rest a gelatinous semifluid matter of various degrees of consistency, and contained in cysts of various sizes.

The body was examined after death. Many of the points of skin where the sutures had been were open, and where the tapping had been last performed there was an opening the size of a quill, permitting a free communication between the air and the cavity of the peritoneum. Where the ligatures hung out the lips of the wound were apart. The abdomen was opened so as to allow the whole peritoneal surface of the wound to be examined. From its extreme upper point down to the quill-sized opening above alluded to the peritoneum was completely and smoothly united, without a single attachment to any viscus, or any apparent diminution of its natural smoothness or moist polish. Below this opening, near to which some long and firm adhesions had been formed, the peritoneum was also completely united till it reached that portion where the incision rested on the projecting surface of the uterine tumour. At this portion, for nearly three inches, the edges were separate, and kept so by the tumour. Here attempts at adhesion had been made in vain, and suppuration had been substituted. Matter and lymph lay on the surface of the tumour, and some spoonfuls of matter had accumulated at the ligatures near the broad ligament, but were confined by adhesive deposit. The viscera were generally healthy, excepting the uterus, which was elongated and flabby, and had its fundus occupied by a large fibrous tumour, with a smaller one on its anterior wall.

Some of the surgeons, whose operations are above noticed, have made, relative to the results of the large abdominal section for removal of a diseased ovarium, erroneous statements which it is necessary to correct. Mr Clay endeavours to show that, of thirteen cases (the whole with which he was acquainted), in which the large incision was performed, only one died; whereas, by the small incision, five were successful and five fatal. Mr Southam, again, wishes to exclude from his tables all those fatal cases in which the tumour turned out to be other than ovarian. But he still admits that, even according to his own showing, the mortality turns out to be "nearly one in four of those actually extirpated."

In order, so far as lies in our power, to place the merits of this operation in the proper light, and enable all to judge of its value as a means of cure, we subjoin a table including all the cases hitherto published which have come under our notice. We are aware, however, that the operation has been several times attempted in America; but on these cases we have not yet been

able to lay our hands. According to our tables, the large abdominal section has been performed forty-two times for the removal of diseased ovaria, or for the removal of tumours which were regarded as such. This number, however, may be naturally divided into two classes—viz. 1*st*, those in which the tumour was extirpated; and 2*d*, those in which the tumour was not extirpated, or no tumour at all was found.

Tumour extirpated.

	Cured.	Died.
L'Aumonier,*	1	0
Dr Macdowell,	3	1
Mr Lizars,	1	1
Dr Smith,†	1	0
Dr A. G. Smith,	1	0
Dr Quittenbaum,	1	0
Dr Ritter,	1	0
Dr Stilling,‡	0	1
Dr Rogers,	1	0
Dr Chrysmar,	1	2
Dr Granville,	0	1
Dr Atlee,	1	0
Mr Key,	0	1
Mr Greenhow,	0	1
Mr B. Cooper,	0	1
Dr Clay,	4	1
Mr Southam,	1	0
Mr Walne,	3	1
Dr Bird,	2	0
	22	11

Tumour not removed, or no tumour found.

	Cured.	Died.
Dr Macdowell,	1	0
Mr Lizars,	2	0
Dr Granville,	1	0
Professor Dieffenbach,	1	0
Dr Martini,	0	1
Writer in Froriep's Noti.	0	1
Dr Clay,	0	1
Mr Walne,	1	0
	6	3

Now, it is remarkable that in both these tables, in that one which includes the cases in which the tumour was removed, and in those in which it was not, or in which no tumour existed, the results are equally the same. Exactly one died out of every three who were operated on. It is scarcely, however, to be expected that all the fatal cases, in which the operation has been performed, have been published. It would be perfectly legitimate, therefore, to conclude that the fatality is greater than these tables prove it to have been. Now, the question for consideration is, are we warranted to recommend or to perform an operation which proves fatal to one out of every three cases? that is to say, is it allowable to sacrifice one human being for the benefit of two survivors? Those who have appeared as the most strenuous advocates for the operation assert that the abdominal incision for the removal of diseased ovaria is as legitimate an operation as amputation of the thigh, the operation for hernia, for stone, or other great surgical opera-

* In L'Aumonier's case the incision was four inches long, and the ovary was torn away, after letting out the matter from a large abscess in the Fallopian tube.

† In Dr Smith of Connecticut's case, the incision was four inches long, and the tumour was drawn through it, as in the small-incision operation.

‡ In Dr Stilling's case the incision was six inches long, and the tumour extracted through it, as in the small-incision operation.

tions, seeing that the mortality is not greater than that which attends these operations. We shall, therefore, very shortly attempt to point out the proper light in which we conceive this question ought to be viewed.

If we look alone to the mortality, independent of all other considerations, and assume the above tables as correct in giving the ratio of mortality for the large abdominal incision, we find that the mortality is not greater than for other great surgical operations. Thus M. Malgaigne has shown that in all the Parisian hospitals, from 1836 to 1840 inclusive, 201 amputations of the thigh took place, but of this number 126 died; and the result of amputations of all kinds showed a mortality of 38 in the 100 for pathological causes, and 49 in the 100 for traumatic causes. M. Textor, on the other hand, in mentioning the statistics of strangulated hernia treated at Wurtzbourg from 1836 to 1842, mentions that, of those subjected to an operation, 32 were cured and 24 died, or 3 out of every 7 cases; while at Paris the mortality was 4 out of every 7 cases. All this would seem, therefore, to be a strong proof of the legitimacy of the abdominal section, seeing that the mortality is not so high for it as for these surgical operations. This is quite true; but the difference between the one operation and the other is this, that the one saves 3 out of every 7 patients who could not by possibility survive even a few days were the operation not performed; and the other sacrifices one unnecessarily to prolong for a few months or years the lives of two who would perhaps, after all, have lived as long had no operation been performed. In the one case, the amputation, or operation for hernia, is performed for the legitimate purpose of saving life which otherwise could not be saved; in the other case, as the abdominal section, life is heedlessly sacrificed, in the attempt to relieve what, after all, is only a burden, and has never yet been proved to shorten the average duration of human life. In the one case the surgeon is acting in conformity with the highest principles of humanity and morality, doing all he can to save the life of a fellow creature; in the other, while we cannot deny that he may conscientiously believe that he is undertaking what is to save life, we fear he is influenced more by the eclat of performing a great and dangerous operation.

But independently of this moral objection, and we hold it to be of itself unanswerable, there is another which the history of the cases of abdominal section painfully point out. This is the impossibility of detecting beforehand whether the case be a proper one for operation or not. Thus the above table shows, that, out of 42 cases which were operated on, in 9 either no tumour was found, or it had contracted such firm adhesions to the surrounding organs that it could not be removed. Now, we would calmly ask those men who defend this operation, if it be consistent with the common principles of surgery to risk unnecessarily the life of

every fourth patient by performing a dangerous operation, which will fail to relieve her in any way, and which will necessarily kill one out of every three subjected to it? Is it not, on the other hand, the first principle of the surgical department of the healing art, that an operation is never to be performed, till all the resources of art have failed to relieve the patient, and the delaying an operation would be attended with fatal consequences? Is it not, in fact, to save life that every great operation is performed, and only then when it is apparent that it offers the only means of preserving the life of the individual?

But what is the case with those labouring under ovarian diseases? They may not only survive for years, but, by appropriate medical treatment, the tumour may in many cases be greatly reduced or rendered stationary. But even if this desirable end should not be attained, we know that life may be prolonged for an indefinite period without having recourse to extirpation. The tumour may be again and again evacuated of its fluid contents, with comparatively little risk to the patient's existence; and those cases in which the tumour is more solid are the very ones which even the advocates for the abdominal section allow are unfit for operation.

An unbiassed and calm review of all these points cannot fail to satisfy every one but those who take this means of bringing themselves into notoriety, that the abdominal section for the removal of ovarian tumours is uncalled for, is an useless sacrifice of human life, and never can become one of the legitimate operations of surgery.

Art. III.—*Principles of Medicine; comprising General Pathology and Therapeutics, and a brief General View of Etiology, Nosology, Semeiology, Daignosis, and Prognosis.* By Charles J. B. Williams, M. D., F. R. S., &c. London, 1843. 8vo, pp. 389.

In our fifty-sixth volume, (p. 219,) when introducing to the notice of our readers the work of Dr Bright and Dr Addison, we took occasion to explain the nature and objects of that department of Medical Science called General Pathology, and to illustrate its relations to Morbid Anatomy, and Special Pathology and Therapeutics; and we at the same time gave a short account of the principal treatises which had been published on General Pathology, and attempted to form an estimate of their respective merits. From this account it resulted that the greater number of the works on that subject was published by foreign physicians, who, it also appeared, had at all times devoted much attention to the study of the general principles of pathology.

We presume that the value and utility of these general princi-

ples, especially to the pupil in acquiring the knowledge of medicine as a science, must be admitted by all; and we, therefore, understand that it is superfluous to say any thing on the usefulness of studying such a branch of knowledge. It cannot be denied, however, that the value of this branch of medical study has not been so generally or so readily admitted by English physicians as in the foreign schools; and while English physicians have devoted their attention, almost solely and exclusively, to the cultivation and study of Special Pathology and Therapeutics, the subject of General Pathology has always received a considerable share of attention from those of the foreign schools.

Now, however, a change may be expected to take place. The first indications of this change may be seen in the Outlines of Mr Mayo, published in 1835, and which contain a very useful and instructive summary of the Principles of General Pathology for that time.* Another indication of the same taste may be seen in the present work, in which the author professes to present, under the name of Principles of Medicine, a view of the actual state of knowledge in General Pathology and Therapeutics.

Passing over the introduction, which is a sort of lecture recommending the study of general pathology, Dr Williams gives first a short preliminary view of his subject, explaining the nature of disease; and then enters on its divisions, which he arranges under the following seven heads:—1. Etiology; 2. Pathology proper, or pathogeny; 3. The proximate Elements of disease; 4. Structural Diseases, or diseases of nutrition; 5. the Classification, symptoms, and distinction of diseases; 6. the Prognosis of the course and termination of diseases; and 7. Prophylaxis and Hygienics.

Under the first division is given a view of the usual causes of disease, classified and specified so far as they are known. The predisposing causes of disease are distinguished and enumerated in the following manner:—1. debilitating causes, as imperfect nourishment, confinement in impure air, exposure to extreme heat or cold, intemperance, and depressing powers; 2. the plethoric state; 3. the existence of previous disease, dynamic or organic; 4. hereditary tendency; 5. temperament; and certain age or periods of life.

The exciting causes are divided into those which are cognizable, and those not cognizable. To the former head are referred mechanical and chemical agents, ingesta of various kinds, bodily exertion, mental exertion or excitement, evacuations, suppressed or diminished, and augmented, and temperature. To the latter are referred endemic, epidemic, and infectious agents,—generally operating as poisons, more or less energetic.

The second chapter on pathology, properly so called, or the nature and constitution of disease, is subdivided into sixteen sections.

* Outlines of Human Pathology, by Herbert Mayo, F.R.S. &c. London, 1835.

The author thinks that, as in chemistry there are certain principles or elements which admit not of further decomposition or analysis, and must therefore be allowed to be in the meantime elementary principles, so in disease there are certain principles so simple, that, so far as our present knowledge goes, they admit not of resolution, and hence, he argues, ought to be regarded as simple or elementary principles of disease.

The chief of these proximate elements he specifies in the following manner: The blood-vessels and their different conditions, anasarca, plethora, congestion, determination of blood, and inflammation; the nervous system, with its different functions, sensation, volition, reflected excitement, sympathy, and irritation; the secreting organs and membranes, with their relations to the vessels, the nerves, and to the purposes which the secretions serve in the animal economy; and, *lastly*, the elements of structural diseases, new formations, and parasitic animals.

Then follows one general head of functional or dynamic diseases, which we infer, from what follows, is intended to embrace the three first-mentioned divisions. It is, nevertheless, not very easy to trace any connection between the above-mentioned enumeration of proximate elements and the subsequent course of this chapter, in which the author considers, in successive order, the subjects of diseased irritability, diseased tonicity, diseased sensibility, diseased voluntary motion, diseased reflex and sympathetic nervous influence, diseased secretion, diseases of the constituents of the blood, diseases of the red particles, diseases of the fibrin and white globules, albumen and other animal principles in the serum, oil or fatty matter in the blood, saline matter, water, changes in the blood by respiration, changes in the blood by secretion, changes in the blood from the transformation of chyle and of the textures, and changed properties of the blood from the presence of foreign matters.

As examples of the mode in which the author treats these subjects, we give the following extracts on two points in pathology, which present at once considerable difficulties, and on which all are anxious to obtain correct information. The subjects are the pathological states of the blood in rheumatism and in gout.

"251. The *perspiratory secretion* contains lactic acid and lactates of soda and ammonia, which probably proceed from the transformation or decay of the textures, particularly the muscular. Hence these products abound during great muscular exertion; and when perspiration is checked by external cold, (§ 77,) they may be retained in the blood, causing rheumatism, urinary disorders, or various cutaneous diseases. The very serious effects sometimes resulting from sudden cold on the perspiring body may be partly owing to the same cause, as well as to the disorder produced in the circulation. Rheumatism is especially liable to occur as an effect

of cold, where the body is fatigued with much muscular exertion, (§ 30); and I have frequently observed that the rheumatism chiefly affects the limbs which have been most exercised. Where the skin fails to excrete, an increased task is thrown on the kidneys, whence may result various diseases of these organs; and if these organs fail in the task, the lactic acid accumulates in the blood, and, probably acting as a ferment, (§ 56,) causes the formation of more, and of the kindred products, lithic acid and its compounds: these, in inflammatory subjects, excite rheumatic fever; and in more torpid frames, various local rheumatic or gouty affections. All these cases are frequently remarkable for the acid character of the cutaneous and renal excretions.

"252. The remedies for rheumatism, therefore, should not be merely antiphlogistic, but also of a kind calculated to eliminate the morbid matter from the blood. In slight cases, sudorifics may suffice; but in others, the kidneys and liver should also be excited to assist in the process of elimination, and various combinations of colchicum and alkalies with mercury, opium, and iodide of potassium, will generally effect this purpose very satisfactorily.

"253. The changes of the blood from the transformation of the chyle and of the textures, including the processes of nutrition and reparation, have been examined too little to supply to the pathologist any distinct data. Prout, Liebig, and other organic chemists, have advanced interesting views on these subjects, but they are too hypothetical to be generally applicable to medicine. It seems quite warrantable, however, to connect with these changes two remarkable states of disease, on the pathology of which chemistry has thrown much light, *gout* and other *lithic acid diseases*, (§ 176,) and *diabetes*.

"254. Gout, and the commonest kind of urinary gravel, are now generally considered to depend on the production in the system of an excess of lithic acid. This acid, being a highly azotized compound, is abundantly generated in those who take a large proportion of animal food, and in whom the digestive and assimilative processes are impaired. Hence it is produced by high living and sedentary habits. It is one of the lower forms of animal matter into which the higher principles, fibrin, albumen, gelatin, &c. tend to pass in their progress towards dissolution. Hence it is produced in excess where there is more azotized matter than is wanted for the reparation of the textures, or than the vital assimilating powers can appropriate for this purpose. But it probably results also from the decay of the textures, especially during febrile or inflammatory irritation, during and after which copious deposits of the lithates are seen in the urine.

"The morbid effects of an excess of lithic acid will vary considerably, according to its amount and other circumstances. The kidneys are the proper emunctories by which it is eliminated from the blood, and these sometimes suffer from the irritation which it causes; hence nephralgia and nephritis may occur: or the water and alkali secreted with it in the urine may be insufficient to hold it in solution, and it may be deposited in the form of sand or gravel,

or calculus in the kidneys or bladder; and various irritations and obstructions in the urinary apparatus may be the result.

"But sometimes the kidneys may fail in their power of elimination, (§ 170;) the lithic acid and its compounds then accumulate in the blood, and may cause various irritations and functional derangements, (irregular gout,) until at length some circumstance fixes the irritation on a limb, and a fit of regular gout is the consequence. In this fit, if perfect, inflammation is excited, with more or less febrile disturbance, which subsides as a copious deposit takes place in the urine, shewing the removal of the morbid matter, (§ 165.) The more acute and fixed the inflammation, and the smarter the fever, the more abundant is the deposit, and the more free is the patient from disease afterwards. On the other hand, when the inflammation is low, changing its place, and with little fever, it generally tarries long, and the system is not relieved. It is when gout thus lasts long, or frequently recurs, that often its material so accumulates in the joints as to be deposited in the form of a plastery or calculous matter, consisting of lithate of soda, (chalk stones of gout.) This chronic form of gout is connected with more or less permanent disorder of the digestive or assimilative functions, which renders its treatment more difficult or less successful than that of the more acute forms of gout. In such cases (chronic,) lithic acid seems to be engendered in great abundance, being often thrown off in large quantities in the urine for an indefinite period, yet never leaving the body free. Such cases are commonly either hereditary, or those which have been rendered inveterate by intemperate habits, or neglect of proper treatment."

In the third chapter the author considers the secondary or proximate principles of disease, as distinguished from the primary principles, by consisting of two or more primary elements. Here we find *anaemia*, *hyperaemia* distinguished into *plethora*, local *hyperaemia* with diminished motion, local *hyperaemia* with increased motion, the results or effects of *hyperaemia*, as hæmorrhage, dropsy, &c., inflammation, its nature, symptoms, and terminations, varieties, and, *lastly*, the treatment required for these varieties.

Inflammation, which is considered in the concluding part, is represented and defined as local *hyperaemia*, or *an excessive quantity of blood in a part, with motion of that blood partly increased, partly diminished.*

After a short view of the causes of inflammation, predisponent and exciting, the author enters on the exposition of the phenomena and nature of inflammation. Here we find he infers, that the definition above given results from the experiments and observations of Thomson, Hastings, Kaltenbrunner, and Marshall Hall; and then he proceeds to inquire into the cause of the retarded motion of the blood, and its eventual obstruction, which, he infers, consists in atony and flaccidity of the vessels. He afterwards, however, allows that much of this obstruction, as well as other phenomena of inflammation, depend on changes which take place in the blood within the inflamed vessels. From experiments

made by the author in 1841 with Mr Toynbee, he infers that the lymph globules, in the shape of white discs, either move slowly along, or adhere to the inner surface of the blood-vessels; and that these lymph globules are unusually abundant in blood during the presence of the inflammatory state.

The fourth chapter, which next follows, is devoted to the consideration of structural diseases, as they are here named, or that important tribe of maladies in which the organization of the textures is more or less altered in different modes; in short, organic diseases. Of these diseases the author does not profess to give a detailed account, as this, he allows, belongs rather to the subject of morbid anatomy; but he presents a general view with the following tabular arrangement:—

ELEMENTS OF STRUCTURAL DISEASE.

- DISEASED NUTRITION
  - Increased = hypertrophy
  - Diminished = atrophy
  - Perverted . . . .
    - Induration.
    - Softening.
    - Transformation.
    - Deposits
      - Euplastic
        - Cicatrices.
        - False membranes.
      - Cacoplastic
        - Cirrhosis.
        - Fibro-cartilage.
        - Gray tubercle.
        - Atheroma, &c.
      - Aplastic
        - Yellow tubercle.
        - Calcareous matter, &c.
    - Growths
      - Non-malignant
        - Cysts.
        - Tumours.
        - Hydatids, &c.
      - Malignant
        - Carcinoma.
        - Encephaloma.
        - Melanosis, &c.
- ALTERED MECHANISM
  - Contraction
  - Dilatation
  - Obstruction
  - Compression
  - Displacement
  - Rupture, &c.

The general view which follows, and is completed in nine sections, is performed with much ability; and we have no hesitation in recommending it as a very useful compendious sketch of the general characters of the extensive and complicated family of organic diseases.

In a short chapter (the fifth) on nosology, the author favours us with his views on classification or arrangement of diseases. He includes in one general censure the whole of the symptomatic nosologists, and Cullen, of course, could not escape. It is certainly unfortunate that Cullen, in his arrangement and definitions, left as diseases so many mere symptoms, transmitted to him by Sauvages, Vogel, and others, who in this career had preceded him. But let us not be unmindful of the services of this able and philosophical physician. Has he not taught the physicians of the present day to recognize his errors? Has his own attempt not

shown that all methods of arrangement are in their nature, and must be, defective and erroneous?

The author next informs his readers that "the true formation of a natural classification of diseases, is in a correct pathology or knowledge of the intimate nature of diseases; but that the subdivisions are conveniently determined by the chief seat of the disease, or by other of its more permanent characters." The classification of Pinel, he adds, approaches to this standard, although it is necessarily imperfect from the infant state of pathology at his period.

This observation would have surprised us, if we had not learnt that nothing ought to be matter of surprise. We have only to observe that Pinel borrowed the whole of the best part of his arrangements from Cullen; and, wherever he has deviated much from that standard, he has done so not very wisely. His arrangement is, further, never to be put in comparison, even according to the standard adopted by Dr Williams, with those of Joseph Frank, Hildenbrand, Raimann, or that presented by the comprehensive treatise of Neumann of Berlin, in all of which diseases are arranged in a much more useful, and also more philosophical manner, than they are by the Parisian author. Were we, indeed, required to distinguish them by appropriate characters, we would say that the arrangement followed by Hildenbrand is the most systematic and philosophical, while those by Joseph Frank, and Neumann are the most useful for studying the art of healing and communicating a correct knowledge of the subject in all its multiplied and varying ramifications.

Next come, in section second of this chapter, the subjects of semeiology and diagnosis, in which the author explains the sources from which symptoms and signs ought to be derived, and the mode in which they ought to be arranged, and especially the selection that ought to be made in forming the diagnosis.

In the sixth chapter, treating of prognosis, the author considers the circumstances from which the prognosis ought to be formed, and explains shortly the different modes in which diseases may terminate fatally.

The seventh chapter, which is also the last, is a mere definition or short explanation of what is meant by prophylaxis and hygienics.

On the actual merits of this work various opinions will be entertained. Some will censure the arrangement; others will complain that certain views have not received adequate attention. In forming any judgment of this nature, it must be remembered that the subject is, in several respects, new; and that it is always much more easy to censure an undertaking after it is completed, than to avoid errors beforehand. The best test is to request any one who is disposed to criticise severely, to make the attempt himself, and see what he can produce. Thanks are certainly due to Dr Williams for what he has done in publishing a work like the present, and it is impossible to doubt, that to the student of medi-

cine, who is sincerely anxious to study and understand the great principles of the science, he has rendered a very useful service. The labours of the student will be facilitated, and his method of study systematized; while the practitioner will be all the better for having his knowledge, whether derived from observation and experience, or from books, made clear, orderly, and precise, by the aid of a work like the present.

ART. IV.—*Natural History, Pathology, and Treatment of the Epidemic Fever, at present prevailing in Edinburgh and other towns; illustrated by Cases and Dissections.* By JOHN ROSE CORMACK, M.D., Edin., F.R.S.E., F.R.C.P.E., Physician to the Royal Infirmary, &c. Edinburgh, 1843.

THE epidemic fever, which has been prevailing in Edinburgh and its neighbourhood for the last twelve months, has, like many other epidemics, given rise to descriptions, various in length and fulness, as the readers of this Journal are well aware. And it is always desirable that of every such epidemic as many good records as possible should be made by eye-witnesses, and preserved for the use of subsequent observers. The present account, which has been published separately, is important in being the most ample and circumstantial that has yet appeared.

Dr Cormack has diligently availed himself of his opportunities, as physician to the fever hospital, in observing the various forms of the epidemic with care, and describing them with fidelity.

Dr Cormack distinguishes the disease into two varieties, the ordinary or moderately congestive form, and the highly congestive form, most usually distinguished by yellowness of the surface.

The first is described in the first chapter, and its phenomena are illustrated by cases; and the second is described in the second chapter, and also illustrated by cases. These cases will be extremely useful to all subsequent observers, in presenting accurate delineations of the particular phenomena of individual cases, which will at all times be the means of demonstrating the correctness of the general descriptions.

In the third chapter, Dr Cormack treats at considerable length of the pathology of the disease, and directs the attention of his readers to various interesting and important facts.

The fourth chapter is devoted to the sequelæ which are occasionally observed to follow the disorder; and the fifth to the subject of treatment.

The sixth and last chapter, which is devoted to the statistical relations of the disorder, contains two very useful tables of the whole of the patients, male and female, treated by Dr Cormack, and every circumstance relating to them calculated to throw light on the etiology and prevalence of the disease.

This monograph must be regarded as a valuable contribution to the natural history of epidemic fever.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY AND PHYSIOLOGY.

On the Accessory Nerve of Willis. By G. MORGANTI. (*Annali Universali de Medecina*, July 1843.)—Goerres and Scarpa ascertained that the *nervus vagus* originated from the posterior, and the accessory nerve from the anterior columns of the spinal cord. Bischoff, Arnold, and Longet, from experiments and from anatomico-pathological observations, arrived at the same conclusion. From these facts it was deducible that the *nervus vagus* was a nerve of sensation, and the accessory one of motion. M. Morganti endeavoured to ascertain whether this was the case by means of experiments on the lower animals. When the accessory nerve was exposed, either in the vertebral canal, between the atlas and occiput, or after it has passed from that canal, pinching it with the forceps always caused contraction of the trapezoid and sterno-cleido-mastoid muscles, but never any indications of pain. When the same nerve was cut through at its exit from the foramen, it was constantly observed that the voice immediately thereafter became rough and indistinct, and was attended with a blowing sound—all indications of paralysis of the *chordæ vocales*. The conclusions which the author draws are the following.

1. The *nervus accessorius* is a nerve of movement.
2. By its external branch it is a motor of the muscles to which it is distributed.
3. By its internal branch it is a motor of the peculiar muscles of the larynx, it is therefore the nerve of the voice.
4. The external branch is formed of the first filaments which come from the spinal marrow, that is to say, of the lower filaments.
5. The internal branch is formed of the last filaments which arise from the spinal marrow, that is to say, those which arise under the *nervus vagus*, and forms in part the pharyngeal nerve; it forms also the recurrent nerve, and gives the motor filaments which the tenth pair distributes in its course.
6. The accessory forms the anterior branch of the *par vagum*.

On the Formation of Wax, in reference to the Theory of Nutrition. By Mr MILNE EDWARDS. (*Comptes Rendus des Seances de l'Academie des Sciences*, 18th September 1843.)—Huber, the celebrated entomologist, by confining bees in a close hive, and feeding them with pure honey or sugar, found that they continued to construct the honeycomb as if they had been allowed to get access to flowers. He therefore inferred, that bees possess the power of converting honey into wax. M. Griendlach, of Cassel, more recently attempted to prove the same point. As this fact seemed to be opposed to the theory of nutrition, as advanced by MM. Dumas, Boussing-

ault, and Payon, M. Dumas, with the assistance of Mr Milne Edwards, repeated the experiment. They analyzed a few of the bees before the experiment, to ascertain what amount of fat their bodies contained, and again at the end of the experiment, to see whether any fat was lost. They satisfied themselves that bees, when shut up and fed with sugar or honey, continue to secrete wax; and therefore infer that they possess the power of converting saccharine matter into wax. Mr Edwards, however, is far from thinking that this interferes with the general truth of the conclusions arrived at by Dumas, viz., that animals do not in general possess the power of converting one substance into another of a different chemical composition, provided that other is intended to form a constituent portion of the body. Wax, however, is a true secretion, and, in this respect, resembles the bile or other secreted products, and does not come under the same laws as those substances which are intended to form part of the animal body.

Nutrition of Animals with Sugar. By M. Chossat. (*Comptes Rendus des Seances de l'Academie des Sciences*, 16th October 1843.)—To ascertain the effects of a diet of sugar, M. Chossat made seventeen experiments on pigeons and turtle-doves, and the phenomena observed during life were as follows:—

1. At the beginning the animals remained calm; but after a while, uneasiness was observed; and towards the end of life, stupor and prostration of strength, sometimes interrupted by convulsive movements.

2. The sugar was sometimes absolutely refused; often, also, it was ejected by vomiting.

3. The evacuations were sometimes very abundant, at other times were more moderate in quantity. More rarely still, they were in less than natural quantity. They were in general liquid and bilious.

4. The respiration was sometimes natural during the greater part of the experiment; at other times, and that only during a part of the experiment, it was observed to be more or less short, impeded and sibilant.

5. The animal heat was first maintained at a natural elevation, but later in the experiment it fell, and before death was very low. In other cases, however, it was notably elevated, and when death occurred, the animal heat was greater than natural.

6. All the experiments terminated in death, which seemed to take place by a kind of asphyxia. The lungs were found oedematous, and the brain and spinal marrow strongly injected with bluish-black blood.

M. Chossat also subjected nine pigeons to a diet of sugar, for the purpose of ascertaining whether this substance contributed to the production of fat. He ascertained that a sugar diet sometimes contributes to the formation of fat, sometimes of bile. That in those cases where there is a tendency to the formation of fat, there is a greater or less amount of constipation; but when to the formation of bile, there is diarrhœa. From this, it may be presumed that, during a sugar diet, we may have it in our power to favour the formation of fat at will, by inducing a costive habit of body.

On the importance of Fat in the Metamorphosis of Animal Matter, and on the Production of Lactic Acid in particular. By M. Lehmann of Leipsic. (*Schmidt's Journal*, vol. xxxix. p. 144.)—In a very long and interesting paper, M. Lehmann endeavours to show the importance of fat in nutrition, and as an article of diet. From numerous experiments made, first in the laboratory and afterwards on himself, he ascertained that digestion and nutrition were imperfect unless the food contained some fatty matters. His experiments even go the length of almost proving that fatty matters undergo such a metamorphosis in the body, that they in some in-

stances become converted into azotized compounds, as had been long ago asserted by Dr Prout. By experimenting on himself, he ascertained that food, carefully deprived of all fatty matters, was with difficulty digested. He could not endure, even for two days, a non-azotized diet, in which some portion of fat did not exist; but starch, mixed with fat, was easily digested, and borne for three successive days.

M. Lehmann found that fat acted as a kind of ferment, so to speak, in the digestion of food; that is to say, it promoted their solution in the stomach, or in the gastric juice out of the body, in a remarkable degree. Nay, he found that gastric juice, totally deprived of the peculiar fatty matter always found in it, loses its property of digesting aliments. The presence of fat M. Lehmann regards as essential to the perfect formation of lactic acid in the stomach, from sugar, starch, &c.

MEDICAL PATHOLOGY.

On the Rarity of Consumption in Marshy Countries. By M. NEPPLE of Lyons. (*Bulletin de l'Academie Royale de Medecine*, 7th November 1843.)—In an interesting communication to the Royal Academy of Medicine, M. Nepple has brought forward evidence to prove that phthisis is a very rare disease in marshy countries. He states that, from the year 1818 to 1829, during which he practised in the marshy canton of Montluel, he was struck with the small number of consumptive, scrofulous, and even goitrous individuals he met with. On investigating the subject more minutely, he found that the more marshy the district, and the greater the number of stagnant ponds and morasses, the more rarely did he observe any traces of these diseases in the farmers and labourers of the district.

To obtain more numerous facts, he wrote to several of his medical brethren in the surrounding cantons, to ascertain whether the same fact had been observed by them. M. Duteche, physician in the canton of Chalamont—a canton much fuller of ponds and marshes than that of Montluel—wrote in answer, that he had never seen phthisical or scrofulous individuals in the communes of Marlieux, Versailleux, Lachapelle, or Saint Nizier-le-Desert, all situate in the Pays de Dombes, where the stagnant marshes are very numerous, and the population very unhealthy. He added, that so convinced was he of the advantages phthisical patients would derive from a residence in such localities, that he purposed to establish a *maison de santé* in an ancient chateau which had been abandoned by its proprietor on account of its general unhealthiness.

M. Pacoud of Bourg, during the course of a practice of 45 years, had not met with a single instance of phthisis during all that time. The hospital of Bourg, which receives its patients from all the surrounding marshy districts, does not contain in its records the history of even a single case of this disease. M. Pacoud adds, however, that children who are boarded away from home, and consequently leave those marshy districts in early life, are occasionally affected with consumption, but removal to the marshy district does not appear to remove the disease. Dr Hudelet of Bourg bears witness to the same fact of the infrequency of phthisis in the marshy districts of Villars, Marlieux, Saint-Nizier; he never saw a single case of that disease.

Dr Monfrin, physician to the Hospital Chatillon-les-Dombes, states that phthisis is very rare in the country of the Dombes; for three years that the Mayor of Chatillon and he kept registers of the deaths in the town, out of 400 deaths, including those in the hospitals, only eight were from phthisis, and one of these was a stranger. The canton of Chatillon, it may be remarked, is not situated in the most marshy district of the Dombes.

MM. Rater and Candy of Lyons, who had formerly practised in the marshy plains of Forez, bear evidence to the rarity of phthisis in that lo

cality. M. Candy, however, stated that it has become more frequent of late years since several of the marshes have been drained.

M. Jolly concurs in the statement as to the rarity of phthisis in the marshy district of Arcachon.

From all these authentic facts M. Nepple concludes that it is impossible to doubt the fact of the rarity of tubercular diseases in marshy districts, whatever explanation may be given of its cause.

Scirrhous Tumour in the Spinal Marrow. By M. Bouillaud. (*L'Experience*, 19th October 1843.)—A man about 24 years of age was admitted, on the 10th of June, into the hospital of La Charité. Since winter he had been complaining of flying rheumatic pains, which for the last two months had become more severe, had been confined to the neck and shoulders, and obliged him to keep his bed. On a careful examination, the spinous process of the lowest cervical vertebra was found projecting more than usual, and pressure on it was painful. There was no loss of movement or of sensation in any part of the body. Defecation and micturition were free, the appetite was good, tongue clean, pulse 92, and heat normal. He was bled, blistered, and put on low diet. On the 19th sleeplessness, with severe headach, came on; his pulse fell to 52, was irregular, and intermittent. On the 22d his countenance had a semi-idiotic look, he heard with difficulty, had frontal headach and ringing in his ears. On the 25th, delirium and jactitation were observed; his face was pale, lips livid, respiration impeded, sighing, and semi-stertorous, jaws closed; slight stiffness of the limbs was also remarked, and urine and feces passed involuntarily. He died at ten of the morning.

The spinal marrow was found surrounded by a copious effusion of limpid viscid serous fluid. On the lower portion of the cervical spinal marrow, a considerable swelling was remarked, which, when cut into, exhibited a tumour of about the size and shape of a large olive. This tumour was unconnected with the surrounding marrow, was on its posterior surface, and compressed it into two flat ribands, which were softened and injected. The tumour itself presented, when cut into, all the characters of the true scirrhous degeneration. At all other points the spinal marrow was healthy. Nothing remarkable was noticed in the brain; when cut into it presented few more bloody points than usual. A tubercular mass was found on the upper side of the left lung. The other organs were healthy.

On Lepra in Sardinia. By Sig. Trompeo. (*Giornale delle Scienze Mediche de Torino*, January 1843.)—It appears, from an official inquiry by the authorities of Turin, made under the direction of Sig. Trompeo, that in the Sardinian States there are 100 individuals in whom leprosy is well marked, and that they are pretty generally distributed over the different provinces. It was ascertained that this malady was undoubtedly contagious, especially when it reached its fourth stage, or stage of suppurative ulceration. It was then communicated by inoculation, or by the immediate contact with the individual, or his clothes. The disease is not rare; and this is attributed in part to the bounty which the government holds out to the leprous—supplying each with a pension of 30 francs per month. In consequence of this, they have the means of transporting themselves from place to place; although, as a general rule, they may be said rather to conceal themselves from the public eye, from fear of communicating the contagion to others. Sig. Trompeo fully satisfied himself, during his tour, that lepra is not limited to the Sardinian States, but that it is also met with in France, especially in that part adjoining Provence, principally at Vitrolles, the coast about Marseilles, and elsewhere.

Sig. Trompeo remarked, that the leprosy which now exists is essentially

the same as that which was known among the Egyptians, Greeks, &c., modified somewhat by time and civilization. Of the 100 cases which he observed, only three, however, presented all the characters of the ancient leprosy. He is clearly of opinion that this affection is perpetuated in Europe, simply because effectual means are not taken to isolate the affected individuals, and prevent them from communicating the contagion to others. The old leper hospitals were undoubtedly imperfect, but, under proper management, he thinks they might have gradually eradicated the disease.

Notice of the Asiatic Cholera in China. Communicated by Rev. W. C. MILNE, Ningpo. (*From Chinese Repository for September*, June 1843.) —It was in the autumn of 1842 that I was induced to examine the question, if Asiatic cholera had ever, really or to any extent, visited China, especially the northern parts of the country. The occasion that led to the investigation of the subject, was the fact that the severest type of cholera had, a little before, broken out in some of the transports that lay abreast of Nanking and Chinkiang fu, (at least so it was reported,) and made its appearance about the same time in the European and Indian hospitals at Tinghai, and in the close alleys occupied by the Chinese, within the west gate of the city. The question above stated, was, at that time, put to me by more than one medical officer in the naval and military services, and a list of queries was handed me to assist in guiding my inquiries.

The result of those inquiries, made both at Tinghai and Ningpo, is now laid down, and the conclusion, to which the reader will come, cannot but be that Asiatic cholera has already, and not unfrequently nor slightly, but often and with great severity, visited China, in common with almost every other nation under heaven. The heads of my inquiries were the following: the names given to the disease; the history of its origin and progress in this country; cause; symptoms; duration of disease; favourable signs; remedies.

I. *Names.*—There is a disease very commonly known among the Chinese, under the appellation of hoh lwan tu sie. The first two characters denote suddenness and confusion, or we may say, 'sudden and violent,' the third signifies 'to vomit,' and the last 'to purge!' The translation of the entire phrase would be 'sudden and violent vomiting and purging.' Another name given to this disease, which corresponds in meaning precisely to the former. It is au sie hoh lwan chi trih, 'a sudden and violent attack of vomiting and purging.' From minute inquiries it would appear that the two characters hoh lwan are intended to express also the violent throes in retching, which generally attend the attack. Hence, they mark out a distinct kind as the kan hoh lwan, or 'dry retching,' a case in which the patient retches violently, without being in the least relieved by vomiting. This type of cholera is attended also by writhing pains in the bowels, and by alternations of chills and fevers. Perhaps this is nothing else than simple colic, or what is often called 'English cholera.'

There is, however, a species of cholera, which is spoken of, by the natives of those provinces which it has visited, in terms that betoken their horror at it, while they regard it as entirely sui generis and utterly incurable. The names given to this type of cholera are not a few.

Tiau kiok sha. The character tiau, from the explanations of the native doctors, in this application conveys the idea of 'bending up as a bow,' a meaning it derives from the original signification it bears of 'grasping a bow for the purpose of bending it.' The second term stands for 'the feet,' and the third is one purely medical, expressive of 'violent pains and writhings in the bowels.' The translation of this name, given to the disease, will therefore be 'bending up the feet and writhing of the bowels.' Kioh kin lwan. The first two characters mean 'feet and tendons;' the last, con-

traction or 'trying up;' *i. e.*, 'a contraction of the feet and tendons.' It is sometimes simply called Kin lwan, or 'a cramping of the sinews.' Kioh kin tiau is a name that signifies 'a bending or curving up of the feet and tendons; Kioh kin chau is a fifth representation of the disease, meaning 'a drawing up (violently) of the feet and tendons.' The only remaining appellation is Chnu kio hoh lwan, or 'a turning up—a rolling up of the feet suddenly and convulsively.' In all these names it will appear that the leading feature in the Asiatic cholera is denoted, viz. the extremely violent cramping of the whole frame.

II. *History of the disease in China.*—The first individual that I met with, who could give any definite account of the disease and its history, was Dr Caang, an aged resident of Ningpo, who bore a conspicuous part, in the year 1842, in arranging to have our incarcerated countrymen restored to us. He is himself an acupuncturist of long standing, and has travelled not little in his own country. From his account it would appear that this severe type of cholera broke out first in the third month of the first year of the reigning Emperor, A. D. 1820, and that it has been transmitted, by a Fukien trading junk, from Siam to Fukien, from which province it travelled into Canton, and thence into Kiangsi and Checkiang, taking a northerly direction until it reached the province of Chili, where it, however, did not commit extensive ravages. The two provinces of Khiangsi and Checkiang are said to have suffered most from devastations. In its progress through the latter province, it reached the department and city of Ningpo, in the fourth month of the first year, or in May 1820; and it is calculated that, in that department alone, two thousand individuals fell victims to its rage, during the first outbreak of the disease. It appeared again in the two following years, but with redoubled violence; and during the summers of these three years, 1820, 1821, and 1822, (for it made its appearance always during the hot weather,) ten thousand persons are supposed to have been carried off in the city and department of Ningpo. After a cessation of eight years, it again broke out, in the eleventh year of Tauk wang, or A. D. 1831, when it raged severely, but not so violently as in preceding years. In the year 1841, it appeared afresh in the city of Chinhai.

Mr Hu, a merchant of Ningpo, confirmed the statements made by the aged doctor—adding, that he was in the city of Ningpo at the time of the disease raging, and that—while he walked the streets on his usual routine of business—he daily saw people suddenly drop down under its overwhelming attack.

My teacher, a native of Hang chau fu, the capital of the province of Checkiang, informs me that it raged there with the greatest severity, in fifth, sixth, and seventh months (summer months) of the second and third years of Taukwang, or during June, July, and August of 1821–2. He says, "people died like sheep" in those days, dropping down dead in the streets apparently without a struggle. He thinks that, in Hangchau fu, several myriads must have perished.

Dr I, a practitioner at the east gate of the city of Ningpo, corroborates all the preceding. He has the idea that the first victim to the cholera was the Emperor Kiaking, the father of his imperial majesty Tauokwang. This I had heard of previously; but, from minuter inquiries, it would appear that H. I. M. died rather of a stroke of apoplexy or paralysis.

Wang Chiyih, a civil officer of Ningpo, and head of the police establishment there, informed me that, in Shantung, his native province, this species of cholera raged furiously during the year noted above, that incalculable numbers died of it, and that there is a vulgar notion abroad there of its having emanated from Lanshan, a mountain in Shantung, fabled to be the residence of the eight genii.

Every person to whom I spoke on the subject, (for I made it a special topic of inquiry,) answered in language most strongly expressive of their

dislike and dread, as if in recollection of past horrors, and in despair of meeting with any antidote.

While the armed expedition lay in the Yangtsz kiang, in the summer of last year, it will perhaps be remembered that several soldiers and seamen fell victims to what was regarded Asiatic cholera; and, about the same date, it prevailed somewhat in Tinghai, carrying off a few Europeans, East Indians, and Chinese.

As to the classes of men which have suffered most its ravages, I could only learn that they were mostly the poorer, that they were under 70 years of age, that there was no particular class of labourers, and that death among males preponderated. But the people of Tinghai had an impression, when it broke out in the autumn of 1842, that young unmarried women were its principal victims. Dr Chang specified the priests and priestesses of the Budhistic religion as exempt from the attack of the epidemic, and attributed the exemption to the favour of the gods. If indeed exempt, it might be that their abstemious habits contributed not a little to it. Or, as that priesthood forms on the whole but a small proportion to the bulk of the people, and would suffer correspondingly, the idea would get abroad that the priests were specially favoured; while the priests themselves would take advantage of the small proportion cut off by the malady, to impress the ignorant with the notion that they had been peculiarly favoured of the gods.

In conversation with my informants, they pointed out the following peculiar feature in the progress of the malady through the country, viz. its leaping over whole districts, and even departments. They instanced his case. As has already been remarked, it travelled from the province of Kiangse into the neighbouring province of Checkiang. Having raged for some time in the district city of Yuhshan, which is on the border of the two provinces, but belongs to the jurisdiction of the former, it suddenly broke out in Hangchau fu, the capital of the latter, having passed over a line of ground about two hundred miles in length, upon which,—without reckoning innumerable townships, villages and hamlets,—there are six considerable cities.

III. *Cause.*—On this point my friends did not presume to pass any conjectures, especially as healthy robust people were so suddenly cut off by it in the prime of their days. Dr Chang, on being asked whether he had ever held any *post mortem* examination to ascertain, if possible, the character of the malady, confessed that, so far from looking at a corpse, he was so frightened that at last he declined attending even upon the living, when his services were called for.

IV. *Symptoms* were the following, as given in detail by the venerable acupuncturist, in reply to the simple question, "What peculiar and distinctive symptoms attended the attack?"—Sudden shaking of the limbs; vomiting, violent diarrhœa; pulse rapid before purging commenced; on purging, pulse ceased; eye dull and sunken after the diarrhœa commenced; person delirious, and afterwards insensible; nails black; lips corrugated, and of a dark purple colour; nose blue; face black; drawing together of the whole body; the bowels greatly pained; no urine, but all purging; convulsions before death.

V. *Duration of the disease.*—The patient generally carried off in four or six hours. They spoke, too, of sudden deaths in the streets.

VI. *Favourable signs.*—The stoppage of purging, and the recovery of sensitiveness in the limbs; motion of the eye.

VII. *Remedies.*—Medicines taken internally of no use; acupuncturing the lower extremities and cauterizing, at a very early stage, sometimes successful, perhaps in two cases out of ten.

Composition of Chlorotic Blood and Urine, and Effect of Ferruginous

Preparations. By M. Herberger. (*Buchner's Repertorium*, vol. xxix. 1843, p. 236.)—The blood of a girl 20 years of age, who was chlorotic in the highest degree, but was otherwise robust, yielded a tolerably firm clot, but no traces of inflammatory crust. This blood was composed of 868 parts of water, and 131 parts of solid matter in 1000. After two months' use of ferruginous preparations, the same girl's blood yielded 807 parts of water, and 192 parts of solid matter in 1000 parts. The solid matter, in the two specimens of blood, yielded respectively, in 1000 parts,

	Chlorotic blood.	Blood after cure.
Fibrine,	3.609	1.950
Albumen,	78.200	81.509
Globuline,	36.470	94.290
Hematosin,	1.590	4.029
Fatty matter,	2.310	2.470
Extractive and salts,	8.921	8.263
Loss,	0.500	0.409

The urine was examined three times on different days before she was put on the use of ferruginous preparations, and twice after the cure, with the following results.

1000 parts of urine during disease yielded,	(1.)	(2.)	(3.)
Water,	975.43	978.21	971.98
Solid matters,	24.57	21.79	28.02
The solid matters were composed of			
Urea,	7.04	7.00	7.12
Uric acid,	0.13	0.21	0.19
Extractive matter,	10.48	9.00	13.99
Salts,	6.80	5.50	6.62
Loss,	0.12	0.08	0.10

1000 parts of urine after cure yielded,	(1.)	(2.)
Water,	940.16	938.70
Solid matter,	59.84	61.30
The solid matters were composed of		
Urea,	26.84	27.36
Uric acid,	0.94	0.96
Extractive matter	18.62	16.28
Salts,	13.32	15.71
Loss,	0.12	0.99

During the treatment M. Herberger states that, contrary to the assertions of Gelis and Vohler, the urine distinctly contained iron, and was very perceptible in that passed in the morning; he also states that iron was contained in the sweat.

New Researches on the Urine in a state of Health and Disease. By M. Lehmann of Leipsic. (*Schmidt's Journal*, June 1843.)—M. Lehmann's experiments on urine are chiefly valuable as having been made on himself, and as exhibiting the different composition of that fluid during an animal diet, a vegetable diet, a mixed diet, and a non-azotized diet. On the mixed diet he continued fifteen days, ate and drank moderately, but abstained from all fermented liquors. The whole urine was each day collected and examined. The result is stated below. He took an exclusively animal diet for twelve days, consuming thirty-two eggs each day. The whole quantity of urine passed daily was examined each day, and the average result is stated below. A purely vegetable diet was also continued for twelve days, but the non-azotized diet was only taken for two days. In the table both the quantities of solid matter passed daily are represented by grammes (15 grains,) and the proportionate amount of salt and animal matter in that quantity of solid matter.

	Solid matter.	Urea.	Uric acid.	Lactic acid and salts.	Extractive matters.
Mixed diet,	67.82	32.498	1.183	2.257	10.489
Animal diet,	87.44	53.198	1.478	2.167	5.145
Vegetable diet,	59.24	22.481	1.021	2.669	16.499
Non-azotized diet,	41.68	15.408	0.735	5.276	11.854

It is interesting to remark on the above experiments, that, during the twelve days M. Lehmann was on animal diet,—taking daily 30.16 grammes of azote, no less than 25.623 grammes of this gas was excreted by the kidneys. The author draws the following conclusions from his experiments.

1. Animal aliments increase the solid matters of the urine; vegetable substances, but especially non-azotized aliments, on the other hand, diminish them.

2. Although the azote is a product of the decomposition of the organism, its proportion in the urine depends on the kind of food taken, seeing that food rich in azote increases greatly the amount of that which appears in the urine. In my experiments, the proportion of urea to the other solid matters was as 100 to 116 for the mixed diet; as 100 to 63 for the animal diet; as 100 to 156 for the vegetable diet; and as 100 to 170 for the non-azotized diet.

3. The quantity of uric acid depends less on diet than on other circumstances. The observed differences were too small to allow any thing to be attributed to the diet.

4. The compounds of proteine, and, consequently, the azote of the food, are absorbed in the intestinal canal. What is not used for the wants of the system is thrown off by the kidneys in the form of urea and uric acid. The kidneys are the only organs by which the system gets rid of its excess of azote.

5. The urine contains quantities of sulphates and of phosphates proportioned to the quantity of azotized matters which have been absorbed. The proportion of these salts increases remarkably by the use of nearly pure compounds of proteine.

6. In the same circumstances the quantity of extractive matter diminishes; but its amount is increased by the use of a vegetable diet;—a fact which proves the influence of a vegetable diet in the production of these matters in the urine.

7. During an animal diet the quantity of lactic acid diminishes, but then the greater portion of this acid is in a free state. The contrary happens during a vegetable diet; the lactic acid is in greater quantity, but in union with bases. During the use of a non-azotized diet most lactic acid is produced, but then it is in union with ammonia. From this it may be concluded that the lactic acid excreted with the urine is, for the most part, formed of non-azotized aliments which have been imperfectly assimilated. A part, however, may be produced from the decomposition of azotized matters of the system or of the food.

8. The kidneys do not only secrete certain constituent atoms of organs which have become unfitted for the purposes of life, but also the excess of nutritive matters absorbed into the system.

Cases of Convulsive Ergotism. By M. Bonjean. (*Comptes Rendus des Seances de l'Academie des Sciences,* 15th January 1844.)—M. Bonjean had previously asserted that the act of baking and of alimentation destroyed in part the poisonous properties of the ergot of rye. In further proof of this opinion, he communicated to the French Academy the following cases of convulsive ergotism, brought on by the use of bread containing a large quantity of ergot.

A family at Envers, in Upper Savoy, composed of both parents and seven children, the eldest 16, the youngest 2 years of age, from the 15th to the 18th of November, partook of ten loaves of bread, consisting of four

parts barley and one rye flour. The mother, 45 years of age, was first affected with poisonous symptoms. On the 18th November she felt ill, and had repeated attacks of shivering. On the 19th, she was much worse, was in a state of stupor and prostration. On the 20th, her hands and feet were in a state of convulsive stiffness, and she had lost all sensibility and consciousness. From this period the convulsive paroxysms came on only at intervals, and she recovered. On the 20th, the eldest boy, 10 years old, a girl 6 years old, and then the eldest, 16 years old, were successively attacked in a similar manner; and on the 21st and 22d the three other children were also more or less affected by similar convulsive attacks. The father, a strong man of about 50 years of age, suffered least, although he had eaten the largest quantity of the bread. The convulsive paroxysms came on pretty regularly, and lasted about twelve hours in each case. During all this period the patients suffered much. After the paroxysm was over, they slept peaceably, and all were hungry and inclined for food when they awakened.

The flour of which the bread was made being carefully examined, was found to consist of 86 parts of sound rye, barley, and seeds of Lychnis gytago, and of 14 of ergoted rye in 100 parts. Two hundred and fifty pounds of this mixture were formed into 218 loaves of bread, which bread, consequently, contained no less than 30½ pounds of ergot. This gives no less than 2½ pounds of ergot as the quantity which was consumed within three days by the family.

From these facts, says M. Bonjean, it is impossible to doubt the influence of heat and panary fermentation in diminishing the poisonous properties of ergot of rye. From the result of more than 40 experiments made on animals by M. Bonjean, he concludes that the same quantity could not have been taken alone without producing fatal effects.

On the Signs of actual Death. By M. Deschamps. (*Annales d'Hygiene Publique*, July 1843.) In a long paper, read before the Royal Academy of Medicine, M. Deschamps endeavours to prove that the only sign of death which can be depended on, short of the putrefaction of the body, is "a greenish or bluish coloration of the abdominal parietes." This sign, he says, is never absent in any case of true death, and is constantly wanting in all those in which death is only apparent. Every other sign by which authors have attempted to prove the loss of vitality may or may not be present, but this one never fails, and may be perfectly relied on. This greenish coloration of the abdomen generally came on with the cadaveric rigidity after the body has cooled, but is hastened by warmth and retarded by cold. In winter, he therefore recommends, that the body be kept in a warm room till the coloration is observed; and if the subject be old, to render the air moist by sprinkling water over the apartment, as this hastens the process.

THERAPEUTICS.

On Blistering by Nettles in Measles. By M. Trousseau. (*Journal de Medecine*, September 1843.)—M. Trousseau recommends the free application of nettles to the surface of the skin in cases where measles or other eruptive diseases have receded, and lead to the production of severe symptoms. He has seen this means succeed when every other had failed. In the case of a girl on whom the eruption of measles disappeared, producing a severe attack of bronchitis, leeches and active emetics failed to bring back the eruption or ameliorate the symptoms. Her whole body was then freely threshed with a bunch of nettles, and, within a few hours after, the eruption had fully returned, and with it every disagreeable symptom disappeared.

Chloride of Sodium as an Ophthalmic Application. By M. Tavignot.

(*L'Experience*, 1st December 1843.)—M. Tavignot states, that he has succeeded in curing several inflammatory affections of the eyes, as well as ulcerations of the cornea, by the application of a lotion of chloride of sodium. He has found this application succeed when all other remedies had failed. After an experience of two years, he has arrived at the conclusion that this form of collyrium is preferable to that of silver or zinc, in most cases of catarrhal and scrofulous ophthalmias, and in many cases of ulceration of the cornea. Several cases are recorded in his paper of the curative powers of this simple remedy, applied in the solid form, like caustic, or as a saturated solution of the salt.

Experiments on the Application of Concentrated Solutions of Nitrate of Silver in Inflammatory Diseases of the Eyes. By M. Delasiauve. (*Bulletin de l'Academie Royale de Medecine*, 3d October 1843.)—From numerous experiments on patients afflicted with inflammatory diseases of the eyes in the hospital of La Charite, M. Delasiauve has arrived at the following conclusions.

1. The nitrate of silver is the best topical application in many inflammatory diseases of the eye and eyelids.

2. In furfuraceous, follicular, and glandular blepharitis this remedy succeeds best when applied in the form of ointment, (half a grain to four and a half grains of nitrate to one drachm of lard or butter.)

3. It is best to apply it in the solid state for granular blepharitis, especially when the granulations are exuberant, and for some ulcerations of the cornea.

4. It is most advantageous to apply it in the state of solution in conjunctivitis, whether that be palpebral or ocular.

5. That in simple or ordinary conjunctivitis a solution of the strength of from one to four grains to the ounce of water is sufficient.

6. That in purulent ophthalmia, but above all in the blenorrhagic conjunctivitis, in order to arrest the disease, it is requisite to apply the solution of the strength of from fifteen to twenty grains of the nitrate to one ounce of water.

7. That in these severe cases the solid nitrate is an equally efficacious application; but there is a danger of applying too much and injuring the cornea.

8. That it is good in using this remedy, alternately to increase and diminish the strength of the application, or even to suspend its use for a while.

Cochineal a Specific in Hooping Cough. By M. Cajetan Wachtl of Vienna. (*Schmidt's Journal*, vol. xxxix. p. 65.)—In consequence of seeing in an English paper the receipt for a very old English specific for hooping cough, M. Wachtl was induced to try it. The receipt was—cochineal 15 grains, carbonate of potass 15 grains, sugar 1 ounce, and water 6 ounces. A tea-spoonful was given three times a-day. Nine cases of hooping cough are related, in which the medicine produced a cure in from two to eleven days, diminishing the number of fits from the first day it was taken. In Scotland, the above mixture has been used from time immemorial, but is made much stronger, viz., cochineal, 10 grains, salt of tartar, 20 grains, water and simple syrup, of each half an ounce; a tea-spoonful to be taken four times a-day.

Case of Elephantiasis cured by Guaiac and Iodine. By M. Cazenave. (*L'Experience*, 28th September 1843.)—A woman, in 1833, remarked a fulness in her right leg, which, without pain, gradually increased, so that she could not pull her stocking over it. It extended over the whole limb, and gradually increased in size, till the articulations of the hip and knee joints

could scarcely be seen, and the limb resembled a solid hard fleshy column. When it was in this enormously swollen state, she had two successive attacks of erysipelas in it, eight years after the limb began to enlarge. In 1841 she came under M. Cazenave's care. The general form of the limb justified the name Elephant's foot. All the usual depressions and projections seen on the healthy limb had disappeared, under the enormous hypertrophy of the skin and cellular tissue. Thigh and leg were confounded in one shapeless fleshy column. Two grooves, formed by a thick overhanging fold of skin, alone marked the situations of the thigh and knee joints. The condyles of the femur and the patella could not be distinguished. The heel and sole of the foot were the only places not involved in the disease. The dorsum of the foot was enormously swollen, and overhung the sole. The skin was of a dead white colour, but sound. No induration of glands or blood-vessels could be detected. The whole tumour had a solid resistant feel, giving a sensation as if pressure were made on a thick ball of India-rubber. There was no pain, but the sensibility was notably deficient.

She was ordered a strong decoction of guaiac and mezereon; the leg was carefully bandaged from the toes, and every other day the bandages were removed, and vapour douches applied to the surface, and an ointment of hydriodate of potash rubbed on. She was put on generous diet and wine, and kept in bed. This treatment was continued for a little more than three months, by which time the leg was reduced to its former dimensions, being then equal in point of size to the sound one, with the exception of a part on the dorsum of the foot.

M. Cazenave states, that he has met with several other cases, which have been all more or less benefited, and some even cured, by this plan of treatment.

SURGERY.

Comminutive Fracture of the Base of the Cranium produced by a Fall on the Feet. By M. Robert. (*L'Experience*, 28th September 1843.)—A carrier, about 40 years of age, fell from a height of about 35 feet, on the 24th of May, and lighted on his feet. He was slightly stunned, but did not appear to be otherwise hurt, and walked home, and was able next day to return to his occupation. Four days after, he began to complain of acute pain in the right ear, and passed a sleepless night. Three weeks after, acute headach came on, and his right eye was observed to squint inwards. He then entered the hospital of La Pitie, where they endeavoured to relieve his headachs by means of bleeding, blistering, and morphia, but without affording him any relief. He then went to the hospital Beaujon, and came under the care of M. Robert. No paralysis of motion or sensation was observed in any part of the body. Fixed pain in the head, and darting pains in various parts of the body, were alone complained of.

On the 20th of September, or four months after the accident, he was suddenly seized with violent delirium, and in spite of active depletion died in 24 hours.

On dissection, the two clinoid processes of the sphenoid bone were found separated from each other, and from the square plate; the petrous portion of the temporal bone was fractured transversely through its upper third, and a large scale detached from the bone. Though the brain was examined with care, it presented no morbid appearances. The arachnoid membrane opposite the fractured portions of bone, and over the central portion of the posterior lobes of the brain, was slightly opaque. The eighth pair of nerves was found torn across.

M. Robert remarks, that this is one of the most interesting cases of fractured base of the cranium on record, seeing that no symptoms followed the fall which could lead to the suspicion of such a severe accident, and

seeing that the fatal symptoms did not come on till four months after the injury. Dissection alone showed the probable cause of the squinting—viz., from the rupture of the eighth pair of nerves.

Valvular Stricture of the Rectum cured by Forced Dilatation. By M. Robert. (*L'Experience*, 21st September 1843.)—A woman, 55 years of age, formerly subject to hæmorrhoids, experienced the usual symptoms of stricture of the rectum. On examination it was discovered that there existed a circular, narrow, soft, granular stricture, about three inches from the verge of the anus. It was resolved to operate by first incising the stricture at points of its circumference, and then employing graduated dilatation. In introducing a dilating speculum for this purpose, it happened that the point of the instrument penetrated the stricture, and, by opening the blades, the strictured ring gave way. Scarcely any pain was experienced, and only a few drops of blood were lost. On examination by the finger it was found that the stricture had completely disappeared, and the cellular tissue of the part was exposed. The part rapidly healed on dressing it with lint and simple ointment.

Polypous Tumour of the Bladder removed by lithotritic instruments. By M. Vache. (*L'Experience*, 5th October 1843.)—A man addicted to strong drinks became affected with all the symptoms of stone in the bladder, constant desire to micturate, pain in passing water, which was occasionally suddenly stopped, and was frequently mixed with blood, &c. On being sounded carefully several times, a soft tumour was detected projecting from the right side of the trigonal space of the bladder. By careful manipulation it was ascertained that this tumour was connected with the bladder by a narrow neck, and, by using the lithotritic instruments, it was seized and partly destroyed. The patient was put in a bath, and there passed some fragments of the polypus and a little blood. The next day more of the polypus was passed. No fever or hæmorrhage ensued; and five days afterwards, the remainder of the tumour was broken down, and many large pieces came away with the urine. The pieces had the exact character of nasal polypus. No fever or hæmorrhage followed the operation; only the first urine passed after the operation contained a little blood. Eight days after, the instruments were again introduced, but no remains of the tumour could be discovered in the old site; but a small fungous projection, with a broad base, was felt on the left side of the trigonal space. The projecting portion of this was removed in the same way. The patient, from this period, got rid of all his uneasy sensations; his urine was retained for a longer period; and, six weeks after the first operation, he was dismissed cured. The most careful examination failed to detect the slightest remains of the fungous tumour.

Incontinence of Urine and Enuresis cured by Electricity. By M. Froriep. (*Froriep's Notizen*, October 1843.)—Incontinence of urine frequently comes on after severe rheumatic and gouty affections. In many cases, these affections have been referred to affections of the spinal marrow; but M. Froriep denies this, as any affection of the lower portion of cord, which would cause paralysis of the bladder, would at the same time produce some paralytic symptoms in the voluntary muscles of the lower extremities. He refers it, therefore, to a local affection of the bladder itself, to an affection of the nerves, or of the muscular fibre, or of both. Taking this view of the question, he resolved to try the effect of the local application of electricity. A metallic stylet, terminating in a button point, is introduced into the bladder, with the aid of a gum catheter, which envelopes the whole but the button point. The handle of the stylet is then connected with one of the wires of an electro-galvanic battery,

while the extremity of the other wire is pressed against the pubes. The electric current is passed through the bladder for a quarter of an hour each day. The bladder in general retains the urine better the very first day after the application; but the application requires to be renewed at intervals, till the bladder recovers its full power. Several cases are related of this affection, in people from 30 to 40 years of age, in whom the affection was completely removed by the electricity.

M. Froriep has found this agent equally powerful in removing the weakness on which the enuresis of children depends. In some cases, he found one application of the electricity remove the disease; in others, it required to be repeated at intervals. He found that, in weakly children, a few doses of iron confirmed the cure.

Recovery from Penetrating Wound of Abdomen, with Hernia of Stomach. By M. Lepine. (*Bulletin de l'Academie Royale de Medecine*, 30th November 1843.)—A labourer wishing to put the yoke on a bull, was tossed by the animal, and several penetrating wounds were made in his abdomen by the animal's horns. The largest of these was about 6¼ inches long, and was situate at the upper part of the left side, following the line of the cartilages of the ribs to the ensiform cartilage of the sternum. Notwithstanding the severe injury, the man, with the assistance of his wife, walked home, a distance of about 100 yards. During all the time he made incessant efforts to vomit. He was seen by M. Lepine about two hours after the accident. The large wound gave exit to the stomach, which was enormously distended, to the epiploon, and to the transverse arch of the colon. The stomach seemed to be strangulated by the edges of the wound; a few of the veins on its surface were distended to the size of writing quills.

The colon was first attempted to be replaced, but the repeated attacks of nausea, and efforts to vomit, rendered this a most difficult matter. It was, however, at last effected. The stomach was then attempted to be replaced. The two hands were applied to the great curvature, and pressure made, so as to cause the expulsion of some of its gaseous contents; but the efforts to vomit, the contractions of the diaphragm and abdominal muscles pushed out the stomach as fast as a portion of it was reduced. By perseverance, however, the stomach was at length reduced, and the epiploon soon followed. During the whole time the stomach was beyond the walls of the abdomen, M. Lepine neither felt nor saw it contract, though the efforts to vomit were incessant; and he dipped his hands in cold water, with the view of exciting its contractility. As soon as the stomach was reduced, full vomiting came on, and expelled the food which the man had taken shortly before the accident.

Many other wounds existed over the abdomen, but only one merits special notice. The horn of the animal had entered by the lower inguinal aperture, followed the tract of the inguinal canal, and laid the whole open to the peritoneum, through which the intestines could be seen. The wounds were brought together by the interrupted suture, and the abdomen supported by bandaging. Inflammatory action was moderated by two trifling blood-lettings. Not a bad symptom followed; and the wounds were all perfectly cicatrized, and the cure effected, within twenty-one days.

OBSTETRICAL PATHOLOGY.

On the Periodical Deposition of Ova by Women and the Females of the Mammalia. By M. Raciborski. (*L'Experience*, November and December 1843.)—In a series of most interesting papers, M. Raciborski proves that women and the females of all the mammalia throw off, at particular periods, ova, which may be detected in the oviduct, (Fallopian

tubes). The period at which this takes place in animals is known by the name of the rutting season: in woman it occurs every time when she menstruates. By tracing the character of the Fallopian tubes and of the ovaries through the races of animals, he was able to show that these tubes are truly oviducts, and were similar in function to the oviducts of birds. In the course of his inquiry, and as the result of numerous dissections, he distinctly proved, as Bischoff of Heidelberg had also done, that, during the period of menstruation in women, and of rutting in the mammalia, ova became developed in the ovaries, just as happens in fishes or birds, and are thrown off at that period. In uniparous females only one ovum is so developed; in those who are multiparous several ova are thrown into the Fallopian tubes or oviducts. This takes place independent of fecundation. In fact, fecundation only vivifies the ovum which is thrown off, in the same way as occurs in birds. Provided the male semen reaches the ovum before it has reached the uterus, impregnation takes place; but if there be no fecundation, as occurs in all virgins, and in animals which have not access to males, the ovum is thrown off, or laid, as he terms it, in the same way as we see the unfecundated ovum of birds or fishes laid.

The Graafian vesicles are minutely traced through all their periods of change, from the time when they appear in the interior of the ovary, until they gradually approach the surface of that organ, ready to be thrown off at the period of rutting or of menstruation. As they approach the surface in animals, each is seen to be composed of a vesicle filled with a tolerably limpid viscous fluid, of a somewhat yellow tinge. The walls of this vesicle are formed of four membranes—the peritoneum and covering proper of the ovary forming two of them, and only cover its projecting surface. The third tunic is the most important, forming the membrane proper of the Graafian vesicle. It forms a completely closed vesicle, and encloses numerous vessels. Its internal surface is free, slightly tomentose, and is in contact with a granular fluid. It adheres to the two first coats by loose cellular tissue. The fourth coat is a cellular one, which envelopes the last described membrane on all sides, excepting on its upper projecting one, where it is covered by the two first coats. These coats are all closely applied to one another, and leave no space or fluid between them. As the period of rutting or of menstruation approaches, the most superficial vesicles augment considerably in volume, lose their diaphanous appearance, on account of the increased thickness of the third or membrane proper of the vesicle. At the same time, the liquid becomes more granular than before. At the rutting or menstrual period congestion takes place, and often hæmorrhage, within the interior of the vesicle. If cut into at this period, the vesicles give out a bloody-coloured fluid, floating in which may often be distinguished the ovum proper. In a few days after the rutting or menstruation has commenced, if the female be kept carefully from the male, the vesicle bursts and evacuates its contents. If examined a few days after this, a slight cleft aperture may be distinguished on the surface, but the edges are already re-united. The pouch of the follicle is then seen sensibly diminished in size, and often contains a few small clots of blood.

The changes which this pouch undergoes is one of the most curious of all the phenomena. After the rupture of the follicle the external or fibrous coat contracts, and folds up irregularly this membranous proper tunic of the follicle. It then resembles a bladder pushed into a cavity much less than itself. The sides are pressed irregularly one against the other; and as they at length adhere by their appressed surfaces, a fleshy mass is found occupying the space of the former Graafian vesicle. This mass presents then the colour and consistence of the liver, and when incised, presents a ragged aspect, produced by the change just described. In some cases, the internal cavity is not quite obliterated, on account of a few of the clots still remaining. These fleshy masses may be easily drawn out of their situa-

tion by a pair of forceps, exactly in the same way as the internal membrane of the vesicle might have been before the menstrual or rutting period took place.

In proportion to the time which has elapsed since the rutting period, and in proportion as new Graafian vesicles approach the surface of the ovary, the fleshy masses above described diminish in volume, and assume a fawn colour, or that of a decayed leaf. The ragged aspect on a section is not so distinct; they become deeper and deeper placed in the ovary, and are at last only met with as small fawn-coloured tubercles. These diminish more and more, till first only a fawn-coloured speck is seen, and then they disappear.

In the course of the long series of papers which M. Raciborski has published on this subject, are cited very numerous cases, in which all the facts mentioned were observed on the bodies of women who died during or immediately after or before menstruation, and in the females of animals at the rutting period. They fully bear out M. Raciborscki in the view he has adopted, viz., that in uniparous animals one ovum, and in multiparous animals several ova, are developed every time the animal comes into heat, and are thrown off independently altogether of the animal having access to the male; that the same occurs in women every time they menstruate; that Graafian vesicles, therefore, are to be found in the ovary whenever the animal is at the rutting season, or when women are menstruating, and that *corpora lutea* follow the bursting of the vesicles in every case. Neither the presence of corpora lutea, nor of Graafian vesicles in the ovaries, are, therefore, any proof of the loss of virginity, or of a female having had access to the male. Nothing but the presence of a fecundated ovum in the uterus can prove this.

Case of Interstitial Extra-Uterine Pregnancy. By M. Payan. (*Bulletin de l'Academie Royale de Medecine*, October 31, 1843.)—A woman, 33 years of age, when about three months pregnant, was suddenly seized with violent pains in the abdominal region, accompanied with faintness and sickness. She rapidly became pale, and died in a few hours. It was found that the abdominal cavity was filled with coagulated blood and serous fluid. The uterus was found enlarged to the size it usually has at the third month; but on its upper surface projected a tumour with diaphanous walls, through which could be seen the embryo floating in an aqueous fluid. The *os uteri* and neck were so distended as easily to allow the introduction of the little finger. Its walls were thick, and lined with a pretty thick concressible matter, forming a kind of imperfectly organized pseudo-membrane, which filled the whole cavity of the uterus. There were no traces of blood in the uterus. Above the uterine cavity was found one formed within the thickness of the uterine tissue, and situated towards the upper left side of the organ, at the point where the Fallopian tube enters. This second interstitial cavity was so thin in its walls by the distension and stretching of the parts, that it was translucent over a considerable extent, and allowed the embryo with its placenta to be seen through it. The embryo was perfect, of the male sex, and the placenta was attached to the posterior and upper portion of this interstitial cavity.

MEDICAL POLICE AND TOXICOLOGY.

On the Baneful Influence of the Smoke from Limekilns on Vines. By MM. Aubergier and Lecoq. (*Annales d'Hygiene Publique*, October 1843.)—In consequence of an action of damages being raised by certain vine-dressers against the proprietors of limekilns between Montlucon and Saint-Amand, MM. Aubergier and Lecoq were appointed to investigate into the facts, and ascertain whether the smoke from the kilns had the deleterious influence over the grapes grown in the vineyards exposed to it

which it was asserted to have. They ascertained that, before the erection of the limekilns, the wine raised in these vineyards was good; that during one year when the limekilns were not used the wine was also good, but that every year during which the limekilns were in full operation the wine was so bad as to be scarcely drinkable. These facts showed the noxious quality of the wine was not resident in the soil. They also ascertained that the vineyards were destroyed just in proportion to the amount of smoke the wind blew over them—those in the direction of the prevalent wind being more injured, and to a further distance from the kilns, than in other directions in which the wind blew rarely. They attributed the deleterious influence to the smoke from the coal used in burning the lime, and not to the carbonic acid. They found the red grape much more injured than the white grape in every instance. Indeed, in some instances, the wine made from the white grape was scarcely injured, when the red wines from the same localities had acquired such a disagreeable taste as to be scarcely potable.

On the Health of Workmen employed in the Manufacture of Tobacco. By M. Simeon. (*Annales d'Hygiene Publique*, October 1843.) In France it is the government which has the monopoly of the tobacco, and it employs 5000 workmen in its manufacture. From the report presented to the minister of public works, it appears that this trade is not only not deleterious, but that those engaged in it are less subject than others to the prevalent epidemics, and even to phthisis itself. Thus at Morlaix, where an epidemic dysentery was raging amongst the inhabitants, only one or two were seized with it, and they were men given to intemperance. They, however, recovered. At Lyons, where the typhoid fever was excessively prevalent, not one was attacked during 1842. The same occurred at Tonneins, where the influenza attacked one out of every twenty-five of the inhabitants. Out of 286 workmen engaged in the tobacco trade only two were attacked.

As to phthisis, the facts relative to the freedom of the workmen from that disease are striking. This is the more remarkable, as the snuff-makers are constantly respiring an atmosphere saturated with the dust of tobacco. These men are consequently frequently laid up with catarrhs, but these are, in general, slight and easily removed. If they are frequently attacked, or are originally delicate in the chest, organic alteration of the respiratory organs sometimes occur, but even this is by no means common. The ascertained facts seem to contradict the theory that workers in tobacco are liable to phthisis; and they prove that the manufacturers of tobacco are less liable to phthisis than the inhabitants of the district in which they dwell.

At Bordeaux phthisis is rare among the workmen, and when it does occur it makes less rapid progress than in others. At Havre, where phthisis decimates the population, it is so rare among the tobacco manufacturers that no case has yet been observed. At Strasbourg no workmen have been observed to labour under consumption, though it occurs in their families and is prevalent in town. And at Morlaix and Lille it is much less common among the workmen than in an equal number of men in almost any other profession.

M. Simeon thinks this innocuity of the workmen to diseases may be ascribed to the narcotic properties of the tobacco; but wishes the attention of the medical profession were drawn to the subject, as some advantage might be taken of this valuable property of the tobacco in the alleviation or prevention of disease.

Medico-legal Inquiry into the Diagnostic Character of Ecchymoses. By Dr Henry Bayard. (*Annales d'Hygiene Publique*, October 1843.)—In

a long and valuable paper, M. Bayard, by an extensive reference to facts, endeavours to point out the distinguishing or diagnostic characters of the different kinds of ecchymoses, or effusions of blood, which occur in the human body—as well those which result from injuries (blows or poisons,) as those arising from the state of the system. His conclusions, in which the characters of the one form are contrasted with those of the other, are as follows :—

Traumatic ecchymoses,—1. Are the result of external causes.

2. They have at times a considerable extent, but generally exist only in one place.

3. Tumefaction, more or less apparent, often elastic, and presenting a shining aspect, attends them, and a change in the coloration of the part soon takes place. At first the colour is livid, or lead-coloured, but it becomes violet or reddish.

4. In these ecchymoses the coloration is most intense at the centre.

5. The temperature of the part is above that of the surrounding surface.

6. The blood generally coagulates; but when effused in large quantity it does not coagulate, but gives rise to the formation of abscesses.

7 The seat of the effusion is quite indeterminate and accidental.

8. The capillary vessels are ruptured; the coloration of the tissues disappears on maceration.

9. The coincidence of illness or general disorder of the system is only accidental.

10. The hæmorrhages of the mucous membranes are the result of accidental causes.

Spontaneous ecchymoses,—1. Are the effect of internal causes.

2. Are limited to a small space; but then these spots are numerous.

3. Generally exist without any tumefaction; the blackish tint changes little, and only slowly disappears. The colour is generally brown, or like the lees of wine.

4. In these ecchymoses the shade of colour is uniform over all the spot.

5. The temperature is the same as that of the sound parts.

6. Blood is only effused in small quantity, and remains fluid.

7. General ecchymoses are observed over the whole body; local ecchymoses generally occur on the limbs, and especially on the lower extremities.

8. The capillary vessels are not ruptured; in general the coloration of the tissue does not disappear on maceration.

9. A disease, or general illness, or organic disease, almost always precedes, and is the cause of spontaneous echymoses.

10. The mucous membranes are frequently the seat of spontaneous hæmorrhages.

Case of Poisoning by Aconitum Napellus. By M. Devay. (*Journal de Medecine de Lyon,* December 1843.)—A man in the employment of a druggist swallowed in a mistake for wine about ten drachms of the tincture of aconite, he having himself put it into a bottle the same as that in which was his wine for dinner, and mistaken the one for the other. This occurred about half-past eight o'clock of the evening of 26th October. He instantly experienced a sensation of heat and constriction in his throat, which made him recognize the mistake he had committed. An insufficient emetic administered immediately failed to give any relief. Within half an hour he was seen by M. Devay. He was then suffering from extreme anxiety and agitation; he could not sit a moment in one position; his legs were continually thrown forwards with a convulsive jerk, even while standing. The tongue was whitish; he had slight nausea, but no colic pains. A strong emetic was administered, which acted powerfully.

By eleven o'clock he could not stand erect, and was seized with convulsive movements of the following character :—Upper as well as lower ex-

tremities were bent inwards; the fingers bent strongly over the palm of the hand, and clasping the thumb. It was impossible to open the hand. The feet were in a state of permanent adduction. The face was covered with a cold viscid sweat; the eyes were turned upwards and exhibited nothing but the white of the eye; no pulse could be felt at the temporal or radial arteries. This state lasted three minutes, after which the patient was able to complain; but there was complete blindness; he could neither distinguish persons nor objects around him. He still vomited occasionally, and every now and then fits like those described occurred. At half-past twelve he was in the same state. At one the fits were more frightful and severe than ever. The temperature of the surface was rapidly falling, and even felt of an icy coldness; there were frequent attacks of shivering; the countenance presented the *facies Hippocratica*. During the convulsive fits the head was so strongly drawn backwards that the ligaments were heard cracking. The respiration became stertorous, and mucous rattle was present. Sensibility remained between the fits; he comprehended every thing said to him, but had no power of sensation in the wrists or forearms. Sinapisms and stimulant applications were put over different parts of the body, but these symptoms continued till about three of the morning. Reaction then began, the heat began to rise, the pulse to be felt at the wrist, the action of the heart stronger, and he vomited a little. At four o'clock a copious warm sweat broke out over the body, and from this moment recovery took place. It was three days, however, before he could leave his room, and even then he had a kind of stupid look.

Researches and Experiments on the Antidotes of Corrosive Sublimate, Copper, Lead, and Arsenic. By MM. Bouchardat and Sandras. (*Bulletin General de Therapeutique*, August, September, and October 1843.)—By means of numerous experiments, first made in the laboratory and then repeated on dogs, MM. Bouchardat and Sandras have arrived at many interesting results relative to the antidotes of corrosive sublimate, copper, lead, and arsenic. All these are detailed at length in their long papers on the subject. Their conclusions were, that the following substances may be regarded as antidotes, and employed as such in medicine:—

As antidotes for corrosive sublimate.—A mixture of zinc and iron filings; or powder of iron reduced by hydrogen; or the moist persulphurate of the hydrated peroxide of iron.

As antidotes for copper.—A mixture of zinc and iron filings; iron reduced by hydrogen; porphyrized iron; zinc filings; or the persulphuret of the hydrated peroxide of iron.

As an antidote for lead.—The moist persulphuret of the hydrated peroxide of iron.

As antidotes for arsenic.—The moist hydrated peroxide of iron; the dry hydrated peroxide of iron; and the moist persulphuret of the hydrated peroxide of iron.

These experienced chemists add the following reflections:—This last preparation, the persulphuret of the hydrated peroxide of iron, possesses this superior advantage over all the rest, that it changes the nature of all the four poisons above noticed, and is especially applicable in those cases where we have not had time to find which of the poisons has been taken. As to the manner of administering these antidotes, and the doses which it is necessary to administer, the simplest means appear the best. The powders of zinc and iron may be suspended in any electuary, or they may be swallowed in wafer paper. The magma of the hydrated preparations of iron may be swallowed in the form of jelly, in which they are procured from the druggists. Several draughts of lukewarm water ought to follow the antidote, and the fauces be tickled with a feather, to excite vomiting

and the expulsion of the poison. The efforts at vomiting scatter more effectually over the stomach the antidote which is administered.

As to dose, the experiments proved that 100 grains of the powder of iron or of zinc sufficed to prevent any bad effects from 15 grains of the acetate of copper. Fifteen drachms of the moist magma of the persulphuret were required to produce the same effect with the same dose (15 grains) of the acetate of copper. To act as an antidote to 4½ grains of arsenious acid, 15 drachms of the moist magma of the persulphuret, or 30 drachms of the moist hydrated peroxide of iron, or 20 drachms of the dry hydrated peroxide of iron, were required.

With regard to the time when these antidotes can be administered with advantage, in so far as the acetate of copper is concerned, the lapse of 40 minutes from the time of the swallowing the poison ought not to be regarded as a sufficient reason for not administering the antidote; but arsenic is more quickly absorbed. Nevertheless, the antidote should always be administered, because, though it will not neutralize what is absorbed, it will prevent its further absorption, by decomposing what remains in the stomach.

Decease of Sir Henry Halford. (*From the London Medical Gazette*, March 15, 1844.)—It is this week our painful task to record the death of Sir Henry Halford, which took place on the evening of Saturday, the 9th instant, at his house in Curzon Street, in the 78th year of his age.

Sir Henry had long suffered from occasional attacks of pain, occupying the situation of the nerves of the upper and lower extremities of the left side. These had latterly increased in intensity, assuming all the appearance of tic-douloureux, and only yielding to full doses of opium. After a time the stomach gave way, when the emaciation and debility became progressive, till at length he expired in a state of extreme exhaustion, notwithstanding every effort on the part of his medical attendants (Dr Seymour and Dr Hawkins) to support him.

The deceased was born at Leicester on the 2d of October 1766. His early education took place at Rugby School, after which he went to Christ's College, Oxford; and thence, on the completion of his terms, he proceeded to Edinburgh, then in the height of its celebrity as a medical school.

Having thus finished an education of the highest order which the establishments of the country afforded, he settled in Leicester, practising jointly with his father, Dr Vaughan, the most eminent physician in that part of the kingdom.

In 1792 he came to London, and very rapidly obtained extensive practice. In 1795 he married the Hon. Elizabeth Barbara St John, second daughter of Lord St John. He was created a Baronet by George the Third, and changed his name from Vaughan to Halford, in compliance with the will of his cousin, Sir Charles Halford, whose estates he inherited.

In February 1793 he was elected physician to Middlesex Hospital, an office which, however, he held but a short time, having resigned it in December 1800.

In 1820 he was elected President of the College of Physicians, an office which he continued to hold up to the period of his death, having been annually re-elected.

Sir Henry, as we have said, acquired an extensive practice very soon after he came to London, and for many years afterwards ran a course in this respect similar to Baillie's; while after the death of the latter, in 1823, he was for some time almost without a rival. He was physician to four successive sovereigns, George III., George IV., William IV., and her present Majesty; while he also attended numerous members of the royal family,—and is said to have been consulted by several of the potentates of Europe.

Sir H. Halford possessed considerable classical and literary attainments,

and was justly regarded as an accomplished gentleman. As a physican his excellence was generally regarded as residing chiefly in the power of prescribing for symptoms so as to palliate suffering, in which respect he far surpassed his rival, Dr Baillie, whose excellence, on the other hand, lay in his greater knowledge of pathology.

Sir Henry was considerably under the middle stature, of intelligent countenance, and refined manners; indeed, in the opinion of many, the polish was such as to reflect the sentiments of those who approached him rather than to display his own.

Sir Henry certainly had a large share of professional zeal, and to him mainly, if not solely, is to be attributed the establishment of the evening meetings at the College of Physicians, which, for some time, proved so successful and attractive. Here were originally read most of those essays which he subsequently published, and the popular character of which rendered them extremely well suited to the mixed audience to whom they were addressed.

The following is a list of the essays and orations of which he was the author:—

On the Climacteric Disease.

On the necessity of Caution in the Estimation of Symptoms in the last stages of some Diseases.

On the Tic-Douloureux.

Popular and Classical Illustrations of Insanity.

On the Influence of some of the Diseases of the Body on the Mind.

On the Κωφοι of Aretæus.

Oratio in Theatro Collegii Regalis Medicorum Londinensis, ex Harveii instituto, habita die Octob. xviii., an. M.DCCC.

Oratio in Collegii Regalis Medicorum Londinensis Ædibus novis habita die Dedicationis, Junii XXV., M.DCCC.XXV.

An Account of what appeared on opening the Coffin of King Charles I., in the Vault of King Henry VIII., in St George's Chapel, Windsor, on the 1st of April 1813.

INDEX.

Aberdeen, statistics of stone at, Page 123
Abdomen, lacerated wound of, recovery from . 492
Accessory nerve of Willis, on its anatomy and physiology 479
Air, on its introduction into the veins . . 1
Anatomy, comparative, Mr Owen's lectures on . 195
Animal bodies, chemistry of 182
Antidotes to corrosive sublimate, copper, lead, and arsenic 497
Arm torn off at shoulder-joint, case of recovery in . 236
Arsenic, antidotes to . 497
Artery, carotid, cut for a vascular tumour . 119
Asphyxia, case of, fatal, from a mechanical cause . 390
Barrenness, of alleged, of female twins . . 107
Bennett, Dr J. H., on inflammation . . 24
Bladder stone, statistics of, at Aberdeen . 123
——— polypous tumour of, removed by lithotrity . 491
Blistering by nettles, its use in measles . . 488
Blood, chlorotic, and urine, composition of . . 485
Boyd, Dr, on the statistics of consumption . 239
Brain, case of disease of . 59
Bucnemia, Barbadoes leg, cured by guaiac and iodine . 489
Calomel, its use in purulent ophthalmia . . 234
Canada, influence of climate of, on phthisis . . 63
Cancrum oris. See Gangrene and Obré.
Cautery, use of, in rabies . 235
Chemistry of animal bodies, Dr Thomson's . 182
Chloride of sodium as an ophthalmic remedy . 488
Chlorosis, composition of blood and urine in . Page 485
Cholera in China, history of, and mode of treatment . 483
Chossat, M., on inanition 155
Clay, Mr, his cases of ovarian disease . . . 451
Cochineal, a specific in hooping cough . . 489
Consumption, its rarity in marshy countries . . 481
——— on the statistics of 239
——— influence of climate of Canada on . 63
Cormack, Dr, his work on fever 478
Corpus luteum, distinction between the true and false . 492
Cranium, fracture of base, by fall on feet . . 490
Cyst of orbital cavity . 235
Death, on the signs of . 488
Demodex (follicular worm,) account of it . . 230
Diet, Dr Pereira on . 432
Digitalis not poisonous to domestic poultry . . 238
Ecchymoses, on the diagnostic characters of . . 495
Electricity a cure for incontinence of urine . . 491
——— on muscular 227
Elephantiasis, tubercular, case of, in a man of English parentage 54
——— (Barbadoes leg,) case of, cured by guaiac and iodine . . 489
Empyema, cases of . 375
Erichsen, Mr John, on death from air in veins . 1
Ergotism, cases of convulsive 487
Excision of whole lower jaw . 235
Extra-uterine pregnancy, case of 444
Fat, on its use in transformation of animal matter . . 480
Fever, epidemic, on its prevalence in Edinburgh . . 201
in Glasgow . . 67

Fever, epidemic, on its prevalence in Leith, . . Page 417
Fever, puerperal, on its contagious nature . . . 231
Foxglove not poisonous to domestic poultry, . . 238
Fracture, compound, of lower jaw, case of . . . 347
Gangrene of face, on . . 103
——— lungs, case of . 369
Gout and rheumatism, on the pathology of . . 130
Henderson, Dr, on the epidemic of Edinburgh, 1843 . . 201
Hocken, Dr Edward Octavius, on the treatment of syphilis . 294
Holland, Dr G. C., his case of disease of the brain . 59
——— his statistics of Sheffield . . 156
Hooping cough, cochineal a specific in : . 489
Hospitals, statistics of eight, in Scotland . 75
Hydrophobia, cauterizing wound in 235
Inanition, researches on . 155
Infecundity, on alleged, of female twins . . 107
Inflammation, Dr Bennett on . 24
Intestinal villi, on the structure of 226
Invertebrata, on the anatomy and physiology of . 195
Iodine and mercury, on comparative value of, in syphilis . 294
Iron, dangerous in certain forms of chlorosis . . 234
Jackson, Dr Robert, his case of fatal asphyxia from a mechanical cause . . 390
——— his account of the epidemic fever of Leith 417
Keith, Dr, his hospital statistics of stone in the bladder . 123
——— on the lateral operation of lithotomy . 396
Kerr, Dr D., his operation of tying carotid artery : 119
Kinnis, Dr, his case of tubercular elephantiasis . 54
Lever, Dr J. C., on organic diseases of the uterus . 163
Leprosy in Sardinia . 482
——— Arabian, case of . 54
Limekiln smoke, its hurtful effects on plants . . 494
Lithotomy, Dr Keith on the lateral operation of . 396
——— statistics of, in Aberdeen . . . 123
Lungs, case of gangrene of Page 369
Malaria, on its active principle 231
Malta, Report of cases treated in Royal Naval Hospital . 350
Marriages, unproductive, notes on 107
Marrow, spinal, scirrhous tumour in 482
Martin, Dr W., his cases treated in Naval Hospital, Malta . 350
Menstruation, its influence on the secretion of milk . 228
Mercury and iodine, on comparative value of, in syphilis . 294
Milk secretion, on influence of menstruation on . 228
Monkshood, case of poisoning by 496
Monster, bicephalous and bisomatous, case of . . 58
Mortality in hospitals. *See* Hospitals
——— in British navy, medical department . . 237
Nerve, accessory, of Willis, its anatomy and physiology . 479
Nitrate of silver, concentrated solutions of, in diseases of the eye 489
Obré, Mr Henry, on gangrene of face . . . 103
Orton, Mr J., on the influence of the climate of Canada . 63
Ovarian tumours, two cases of, removed successfully . 236
——— on the removal of, by abdominal section . 451
Parasite of sebaceous follicles . 230
Pereira, Dr, his treatise on diet 432
——— *Mr J. A.*, his case of bicephalo-somatous monster . 58
Phlebitis (inflammation of the veins) on . . 233
Phthisis, on the statistics of . 239
Polypus of bladder, removed by lithotrity . . 491
Puerperal fever, on its contagious nature . . 231
Puncture, use of repeated, in spina bifida . . . 236
Quotidian ague, cases of . 392
Rabies, use of cautery in . 235
Rheumatism, on the pathology of 130
Rectum, stricture of, cured by dilatation . . 491
Scarcity, its influence on disease and mortality . 232
Sheffield, the vital statistics of 186
Shoulder-joint, arm rent off at, case of recovery in . 236
Simpson, Dr J. Y., on alleged infecundity of female twins 107
Silver, concentrated solutions of

nitrate of, in diseases of the eye . . Page 489
Smith, Dr David, on fever in Glasgow . . 67
Sodium, chloride of, on, as an ophthalmic application . 498
Southam, Mr, his cases of ovarian disease . . 451
Spina bifida, cure of, by puncture 236
Statistics, vital, of Sheffield 186
Stone, hospital statistics of, in Aberdeen . . 123
Stratton, Dr Thomas, on quotidian ague . . 392
——— his proposal for graduating thermometers . 223
——— on the mortality in the medical department of British navy . . 237
Stricture of rectum, case of, cured 491
Sugar, its effects on nutrition of animals by . . 289
Syphilis, on comparative value of mercury and iodine in . 294
Thermometers, a new scale for graduating, proposed . 223
Thomson, Mr J., on hospital statistics . . 75
——— *Dr Thomas*, chemistry of animal bodies . 189
Tobacco, manufacture of, its influence on the health of the workmen . 495
Todd, Dr R. B., on gout and rheumatism . 130
Tracheotomy, on its use in chronic laryngitis . 341
Typhous fever, on the difference between, and the epidemic of 1843–44 . Page 201, 429
Tumour, vascular, case of, like aneurism . 119
Urine, incontinence of, cured by electricity . 491
——— physiological and pathological characters of . 486
Uterus, on organic diseases of 163
Veins, on air introduced into 1
——— on inflammation of, . 233
——— pulmonary, on communication of air cells with . 226
Vesicles, air, on the communication between, and pulmonary veins . . 226
Villi, intestinal, on their structure *ib.*
Vital statistics. See Sheffield and Holland . . 186
Wabe, Mr, his cases of ovarian disease . . 451
Watson, Dr Alexander, on tracheotomy, with cases . 341
——— his case of fracture of lower jaw . 341
Wax, on its formation . 479
Williams, Dr C. B., his elements of medicine and general pathology . . 471
Willis, the accessory nerve of 479
Wound, lacerated, of abdomen, recovery from . 492
Worm, or parasite of sebaceous follicles . . 239

END OF VOLUME SIXTY-FIRST.

No. CLX. will be published on the 1st of July.

EDINBURGH: PRINTED BY STARK AND COMPANY, OLD ASSEMBLY CLOSE.

JUN 1969
WESBY

3 2044 103 055 802